SAPP

Final Environmental and Social Management Framework for the Southern African Power Pool

Executive Summary

The Southern African Power Pool (SAPP), established in 1995, was the first formal international power pool in Africa. SAPP's primary aim is to provide a reliable and economical electricity supply to the consumers of each of the sixteen SAPP utilities and Independent Power Producers (IPPs), consistent with the reasonable utilisation of natural resources and effects on the environment, and a stable interconnected electrical system. In 2009, SAPP completed the revision of the Pool Plan, which culminated in a list of priority power projects. A review of the status of project implementation in 2011 found that most of the selected priority power projects needed extra developmental work to bring them to bankability stage. The SAPP Coordination Centre (SAPP-CC) requested financial support from cooperating development partners to secure project preparation funds, resulting in a grant from the World Bank International Development Association (IDA) to set up a Project Advisory Unit (PAU) that would accelerate the implementation of priority power projects in the region.

One of the first tasks of the SAPP-PAU was to commission technical specialists to assist in preparing an Environmental and Social Management Framework (ESMF). An ESMF was drafted in 2016, with further updates taking place in 2018. The ESMF will act as a reference manual to assist in the high-level environmental and social screening of projects to strengthen the assessment, mitigation and management of risks and impacts. This tool is particularly relevant where project loans are required from international financial institutions that apply policies, standards and guidelines to safeguard environmental and social sustainability. The ESMF provides guidance for priority power projects of different categories based on the extent and significance of the likely impacts and risks.

The ESMF for the SAPP acceleration programme was prepared in an iterative manner in the following two broad phases: phase 1 involving targeted missions and site visits, stakeholder engagement and drafting of the ESMF followed by disclosure; and phase 2 involving the update to the ESMF and additional stakeholder engagement. During the development of the ESMF in 2016 stakeholders (e.g. SAPP-ESC, utilities, government ministries and agencies, development financial institutions and associations) were consulted in a number of ways, including workshops, site visits, focus group meetings, face-to-face meetings and telephonic interviews. During the update of the ESMF in 2018, stakeholders from civil society organisations, financial institutions, research organisations and utilities were consulted. Stakeholders raised planning, institutional, technical, funding and management issues pertaining to the development and implementation of energy projects, which informed the ESMF development process.

The ESMF aims to assist project proponents to identify and manage the environmental and social risks and impacts through appropriate mitigation measures that may arise with the assessment of the priority power projects, in order to inform the design and engineering feasibility options. The ESMF aligns the development cycle of projects with environmental and social assessment procedures to ensure that: (1) there is early engagement between project planners and compliance staff responsible for environmental and social management; and (2) the requirements of relevant financial institutions are identified prior to commencing an environmental and social assessment. This approach ensures that the material risks and impacts are identified at the planning stages of the project development cycle, thus ensuring that suitable project alternatives are identified and environmental and social feasibility studies are appropriately scoped.

The ESMF will form part of an existing suite of documents prepared to guide SAPP utilities and IPPs in ensuring the environmental and social sustainability of priority power projects, notably SAPP's ESIA guidelines for transmission infrastructure, thermal power plants and hydro projects. The ESMF contains a suite of tools and resources to guide SAPP utilities and IPPs through the environmental and social screening, scoping, impact assessment, management planning and monitoring and evaluation processes. These tools and resources mainly take the form of checklists, databases and generic terms of reference.

During screening, the utility and IPP will make use environmental and social checklist, which provides guidance on determining project characterization, project context, stakeholder context, potential risks and impacts and legal and lender context. This information is used to inform the project concept phase and identify site alternatives. The utility and IPP can also refer to situational overviews of biophysical and socio-cultural attributes featured at regional, national and local scale to ascertain potential constraints and opportunities for the development. In addition, a database of national environmental legislation and lists of pertinent safeguard policies, standards and guidelines of financial institutions are presented in the ESMF and can be consulted.

During the scoping phase, the utility and IPP can refer to a generic stakeholder engagement process to ensure that the planned approach and focus of the project engagement process is aligned with good international industry practice, hence fulfilling the consultation requirements of both in-country environmental regulators and development financial institutions. A suite of specialist terms of reference is included in the ESMF to guide the development of tender documents and aid the review of specialist scopes of work. A generic impact rating methodology is also included in the ESMF, although it is noted that the utility and IPP will apply the impact methodology prescribed by in-country environmental legislation and/or funding institution. A list of typical risks, impacts and mitigation measures associated with energy generation and transmission projects is provided for reference purposes.

A number of resources are provided in ESMF to assist the utility and IPP with management planning and monitoring and evaluation. Examples of generic environmental and social management plans (ESMP) for energy projects are provided to aid in identifying suitable measures to avoid, mitigate and/or manage potential direct and indirect project related impacts. These management plans are aligned with the requirements of development financial institutions. A generic ESMP monitoring and evaluation checklist is provided to assist utilities and IPPs in monitoring environmental and social performance during project implementation.

Once approved, the ESMF will be implemented through SAPP structures to ensure a coordinated and systematic approach to the development and implementation of priority power projects. The SAPP-PAU will provide guidance and technical support for the implementation of the ESMF. The on-the-ground implementation of the ESMF will be the responsibility of the SAPP utilities and IPPs that have departments, units and staff tasked with the planning, screening, scoping, assessment and monitoring of proposed projects. The utilities and IPPs will be the main users of the ESMF. Given that the member utilities and IPPs are also represented on the SAPP-ESC, they will report back on the practical applicability and usefulness of the ESMF. The SAPP-ESC representatives will also liaise with the relevant in-country government institutions and environmental regulators to ensure that there is alignment when screening, scoping and assessing energy projects.

To strengthen the implementation of the ESMF, the SAPP-PAU will play a key role in supporting capacity building and training amongst the planning, financial, environmental and social personnel within SAPP utilities and IPPs to ensure mainstreaming of project planning and funder safeguard requirements. In order to align in-country and international ESIA requirements, capacity building will be necessary for relevant government institutions, including environmental agencies responsible for reviewing and approving ESIAs.

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Acknowledgements

Guidance: SAPP-Coordination Centre, SAPP-Environment Sub-Committee, SAPP-Project Advisory Unit

Report production and internal review: SRK Consulting (South Africa)

Map production: SRK Consulting (South Africa)

Technical input: SAPP member utilities and independent power producers, Ministries of Energy, Ministries of Environment, environmental authorities, civil society organisations, research institutions, advocacy groups and funders

Funding: World Bank (IDA)

List of abbreviations

AfDB	African Development Bank
AREP	Accelerating Regional Energy/Transformational Projects
CDB	China Development Bank
CSO	Civil Society Organisation
DBSA	Development Bank of Southern Africa
DFI	Development Finance Institution
DIS	Directorate: Infrastructure and Services
DRC	Democratic Republic of Congo
EHS	Environmental, Health and Safety
EHSG	Environmental, Health and Safety Guidelines of the World Bank Group
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EPs	Equator Principles
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMAP	Energy Sector Management Assistance Program
ESMP	Environmental and Social Management Plan
ESMPr	Environmental and Social Management Programme
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GIIP	Good International Industry Practice
HCV	High Conservation Value
IAIA	International Association for Impact Assessment
ISO	International Organisation for Standardisation
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standards
IPP	Independent Power Producers
ISS	Integrated Safeguard Systems
KFW	KFW Development Bank
MEAs	Multi-lateral Environmental Agreements
NEPAD	New Partnership for Africa's Development
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OP	Operational Policies
PS	Performance Standard
RAP	Resettlement Action Plan

RSB	Roundtable in sustainable biomaterials
SADC	South African Development Community
SAIEA	Southern African Institute for Environmental Assessment
SAPP	Southern African Power Pool
SAPP-CC	Southern African Power Pool Coordination Centre
SAPP-ESC	Southern African Power Pool Environmental Sub-Committee
SAPP-PAU	Southern African Power Pool Project Advisory Unit
SESA	Strategic Environmental and Social Assessment
SIDA	Swedish International Development Agency
SRK	SRK Consulting (South Africa) (Pty) Ltd
TA	Technical Assistance
ToR	Terms of Reference
UN	United Nations
UNEP	United Nations Environmental Programme
WB	World Bank
WHO	World Health Organisation

Glossary of terms

Cumulative impact	The cumulative impact of the project is the incremental impact of the project when added to impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the project that may occur later or at a different location. Cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time. The environmental and social assessment will consider cumulative impacts that are recognized as important on the basis of scientific concerns and/or reflect the concerns of project-affected parties. The potential cumulative impacts will be determined as early as possible, ideally as part of project scoping
Direct impact	A direct impact is an impact which is caused by the project and occurs contemporaneously in the location of the project.
Environmental and social impact assessment	A process for predicting and assessing the potential environmental and social impacts of a proposed project, evaluating alternatives and designing appropriate mitigation, management and monitoring measures.
Impact	Environmental and social impacts refer to any change, potential or actual, to (i) the physical, natural, or cultural environment, and (ii) impacts on surrounding community and workers, resulting from the business activity to be supported.
Indirect impact	An indirect impact is an impact which is caused by the project and is later in time or farther removed in distance than a direct impact, but is still reasonably foreseeable, and will not include induced impacts.
Involuntary resettlement	Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood1) as a result of project-related land acquisition2 and/or restrictions on land use. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in physical or economic displacement. This occurs in cases of (i) lawful expropriation or temporary or permanent restrictions on land use and (ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.
Risk	A risk is defined as a probability of danger, injury, liability, loss or any other negative occurrence that is caused by external or internal vulnerabilities and that may be avoided through pre-emptive action.
Strategic environmental and social assessment	A SESA is conducted when the project needs to systematically examine broader environmental and social risks and impacts, and issues, associated with a policy, plan or program, typically at the national/regional level but also in smaller areas. The examination of environmental and social risks and impacts will include consideration of the full range of environmental and social risks and impacts. SESA helps integrate environmental and social considerations into the preparation and adoption of policies, plans or programs and promotes sustainable development. SESAs are typically not location-specific. They are therefore prepared in conjunction with project and site -specific studies that assess the risks and impacts of the project.
Significance (of impact)	Ranking of how significant an impact may be, based on its potential magnitude and likelihood and the importance and/or sensitivity of the receptor impacted.
Stakeholder engagement	Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.
Transboundary impact	Any impact caused by a proposed activity, not exclusively of a global nature, within an area under the jurisdiction of a party, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another party.
Vulnerable individual/ group	Individuals/group who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and as such may require specific measures and/or assistance to do so. This will take into account considerations relating to age, including the elderly and minors, and including in circumstances where they may be separated from their family, the community or other individuals upon which they depend.

1 Introduction and background

The Southern African Power Pool (SAPP), established in 1995, was the first formal international power pool in Africa. Executing its mandates through the executive and management committees of the Southern African Development Community (SADC), Directorate of Infrastructure and Services, SAPP's primary aim is to provide a reliable and economical electricity supply to the consumers of each of the sixteen SAPP utilities and Independent Power Producer (IPPs), consistent with the reasonable utilisation of natural resources and effects on the environment, and a stable interconnected electrical system. SAPP member countries are shown on a locality map in Figure 1-1.

In 2009, SAPP completed the revision of the Pool Plan, which the World Bank and the government of Norway funded. The outcome was a list of priority power projects which could be prepared and implemented. A review of the status of project implementation by the SAPP Executive Committee at a meeting held in 2011 found that most of the selected priority power projects needed additional developmental work to bring them to bankability stage. The SAPP Coordination Centre (SAPP-CC) requested financial support from cooperating development partners to secure project preparation funds, as per its mandate. The World Bank International Development Association (IDA) responded by assisting the SAPP with a grant of US$20 million to set up a Project Advisory Unit (PAU) that would accelerate the implementation of projects in the region.

One of the first key activities of the SAPP-PAU, following its establishment, was the appointment of technical specialists to assist in preparing guideline documents. The SAPP-PAU appointed technical experts to prepare an Environmental and Social Management Framework (ESMF) to act as a reference manual to assist in the high-level environmental and social screening of projects to strengthen the assessment and management of risks and impacts. The ESMF is particularly relevant where project loans are required from international financial institutions that apply policies, standards and guidelines to safeguard environmental and social sustainability. The intention is that the ESMF will cater for priority power projects of different categories based on the extent and significance of the likely impacts and risks. The terms of reference for the ESMF preparation process are contained in Appendix A.

1.1 ESMF objective and rationale

The objective is of the ESMF in the context of SAPP's Programme for Accelerating Transformational Energy Projects (AREP) is to provide technical guidance for environmental and social screening, scoping assessment, management and monitoring during preparation of priority power projects covering generation and transmission. The ESMF will address the policies, standards and guidelines that apply safeguards for investments that could have a large-scale impact on biophysical and social environments.

Drawing on existing data and information, the ESMF provides SAPP with the tools to integrate environmental and social due diligence into its technical assistance activities. The ESMF identifies relevant potential environmental and social risks and impacts that may arise from the proposed Programme, drawing on lessons learned from energy projects in Africa. It provides an overview of national, regional and international policy requirements for environmental and social management that a proponent needs to address during project preparation and implementation. Furthermore, it presents a screening and assessment methodology for potential projects to allow for environmental and social risk and impact identification and classification and specifies the appropriate roles and responsibilities of stakeholders. The ESMF presents a suite of terms of reference (ToR) for key specialist studies and management plans that align to international environmental and social policies, standards and guidelines. It also includes, for reference purposes, examples of plans that address stakeholder engagement, resettlement and management of project construction and implementation. Finally, institutional arrangements and processes for implementation of the ESMF as well as the estimated high-level costs for training and capacity building of stakeholders are presented.

Figure 1-1: Locality map showing SAPP member countries

1.2 Potential users of the ESMF

This ESMF has been prepared as a reference manual for use by key stakeholders involved in the SAPP priority power projects, including those involved with the planning, screening, assessment, management and monitoring processes. Reference material contained in the ESMF will be useful to the following stakeholders: the SAPP utilities and IPPs; funding and donor agencies; line ministries in the relevant SADC countries; and project teams involved in addressing environmental and social risks and impacts in feasibility and design studies. It also includes recommendations for training and building capacity of relevant staff from SAPP utilities and IPPs to strengthen their environmental and social management skills, specifically within a project context. This training and capacity building will involve, where relevant, representatives from ministries responsible for the environment and energy as well as environmental authorities.

2 Project description

2.1 Energy sector in SADC

Southern Africa is a large and diverse region with significant growth potential but also major development needs. The fifteen countries in the region are members of SADC (Figure 1-1), established in 1992 to promote socio-economic integration and cooperation on political and security matters. A challenging economic geography poses major constraints to expanding growth and shared prosperity in the region. Access to energy is vital to realizing the region's developmental objectives. Presently, electricity access in SADC poses a key limitation to ending extreme poverty and boosting shared prosperity in region. Electricity access in Southern Africa is around 28 percent, below the continental average of 31 percent, the lowest rate among all Africa sub-regions. Access to electricity cannot be expanded without first increasing power supply in the region. Investments in generation capacity must be associated with investments in the rehabilitation and/or expansion of the national transmission network to allow power to flow within the country or reach the regional market. Cross-border interconnections are also essential to allow countries less endowed with energy resources to access more reliable and cost-efficient supply from neighbours (World Bank, 2014).

Despite the abundance of energy resources in the region (SADC, 2016), generation capacity remains inadequate to accommodate power needs. In addition to rich thermal resources, the region has large renewable energy potential. Nonetheless, the current total installed capacity (57.1 GW of which 51.7 GW is actually available) is not sufficient to accommodate current demand (nearly 53.8 GW) as well as future demand, which is projected to increase by 2-3 percent per annum. It is projected that peak loads will reach nearly 72 GW by 2025. Electricity demand has steadily increased in the last decade, largely driven by the mining and manufacturing sectors. Population growth, rural electrification and improved economic performance have also significantly raised residential demand. Conversely, excess supply capacity has been shrinking since 2007 due to the insufficient investments in new generation capacity (World Bank, 2014).

Expanding electricity supply in line with projected demand growth over time and significantly increased rates of access involves a major scale up of generation and associated transmission capacity. The challenge is that the efficient option in many cases relies on large generation and transmission investments of a scale that cannot be justified based on national demand alone (SAPP, 2009). The full integration of countries' power systems and the development of power trade can change the growth trajectory of the region. Integration hinges upon large and complex generation and transmission projects, whose implementation is particularly challenging. Some projects are geographically located in more than one country, as is the case of hydropower projects using water from shared rivers or most often of cross-border transmission projects. Large-size generation projects, which are often physically located in one country, make sense only in the context of regional power trade. National governments have generally demonstrated a low level of commitment to regional power projects and have tended to retain authority for design and investment decisions within their own boundaries. This is especially the case of generation. Perceptions around political instability and tensions between neighbouring states have exacerbated the problem. Agreements, including Power Purchase Agreements (PPAs), may be difficult to secure because of poor institutional capacity, differences in countries' regulations and if the parties involved are not perceived as creditworthy off-takers (World Bank, 2014).

Against this background, few cross-border projects in the region have been implemented historically and there is concern in the region that strategic and economically important projects will continue to stall. Project preparation entails all the activities needed to take a project from identification through concept design to financial close, including risk mitigation that can help securing financing and design and negotiation of PPAs and other agreements. Precision and quality in preparation is the main condition to attract financing, especially commercial financing. 'Bankable' projects are those in which enough time and money have been invested to establish commercial viability in a way that is sufficiently compelling to attract the private sector. Structuring large energy projects so they achieve financial closure also requires a complex set of skills, including on technical, financial, legal, regulatory, environment and social management, financial management, transaction and procurement aspects. Inadequate preparation resulting in low bankability is now recognized as the main reason for regional projects not moving forward. The scarcity of skills for project preparation has also imposed large costs in terms of reduced confidence by the private sector and delays due to sub-optimal arrangements leading to eventual re-bidding or renewed preparation of projects (World Bank, 2014).

Regional energy development is at the core of SADC's agenda, which has developed protocols and strategies and established dedicated agencies that together form a consolidated institutional architecture driving integration in the energy sector. The key actor is SAPP, which is now the most advanced and organized of all power pools in Africa. SAPP coordinates the power systems of twelve SADC countries, namely Angola, Botswana, DRC, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Nine of the countries are operating members and hence are linked to the interconnected grid that carries around 97 percent of the energy produced in SAPP. The non-operating members, which are yet to construct transmission links to the regional grid, are Angola, Malawi and Tanzania (SADC, 2016). SAPP has a sound governance structure, with its key establishing agreements and operating guidelines signed by both members' governments and utilities. In 2002, the SAPP-CC was established in Harare, Zimbabwe as an arm of the Operating Sub-Committee to monitor operations and transactions within the Pool. Unlike the other African power pools, SAPP has active power trading. However, the lack of adequate transmission infrastructure physically prevents full integration and is an obstacle to freely trading power. The focus of the SAPP has thus shifted more and more to the preparation and implementation of priority regional energy projects that further such regional integration (World Bank, 2014).

The SAPP Regional Generation and Transmission Expansion Plan (SAPP Pool Plan) commissioned by SAPP in 2001 and updated in 2009 has identified a detailed list of priority generation and transmission projects that allow accommodating rapidly rising electricity demand in the region at the least cost over the period from 2006 to 2025. In 2005, the SAPP started developing a thorough methodology to select, among the generation and transmission projects included in the SAPP Pool Plan, those that should be given highest priority by member countries and promoted for investment.

The SAPP Executive Committee expanded the functions of the SAPP-CC in March 2014 to include the establishment of a projects acceleration team with the mandate to carry out project coordination on a project-by-project basis.

2.2 Rational and objectives for the Programme for Accelerating Transformational Energy Projects

In 2014, the World Bank approved a grant to support SAPP in its programme for accelerating transformational energy projects. SAPP, through the SAPP-CC, provides technical and financial support to SAPP utilities and sponsors to bring selected priority power projects to bankability stage. This is particularly relevant where project loans from regional or international financial institutions are required.

The objective of the acceleration programme is "to be accountable for the preparation and implementation of selected and agreed priority regional electricity projects in the Southern African Power Pool region". The programme aims to support the preparation and implementation of regional priority power projects through the SAPP-PAU via the following components:

- **Component A:** Setting up the PAU under the SAPP. During this component the team will be mobilized including supporting specialists required to prepare key deliverables;
- **Component B:** Project Preparation Funds The funds in this component would be managed by the PAU. Key focus will be on the environmental and social performance of priority power projects; and
- **Component C:** Analytical support to SAPP. This component would support analytical work to update critical non-project specific information used by SAPP to support project preparation, including revision of the SAPP Pool Plan.

The development of this ESMF was undertaken as part of Component C of the Programme.

2.3 Institutional arrangements

The design of the ESMF enables coordinated preparation of priority power projects. The SAPP-CC and SAPP-PAU will coordinate and support implementation of the ESMF, which will be the responsibility of the SAPP utilities and IPPs. The leadership and management of ESMF implementation will occur using the existing management structures within the SAPP utilities and IPPs. However, awareness raising, training and capacity building of utility planners, engineers and environmental and social managers as well as relevant government ministries regarding procedures and tools contained in the ESMF is required. Reporting on the implementation of the ESMF will take place through SAPP structures, including the SAPP-CC, SAPP-ESC and SAPP-PAU.

Figure 2-1 provides a high-level organogram of the SADC-SAPP structure within which the SAPP-CC, SAPP-ESC and SAPP-PAU are located. A description of the roles and responsibilities of the various forums is provided after the figure in Table 2-1.

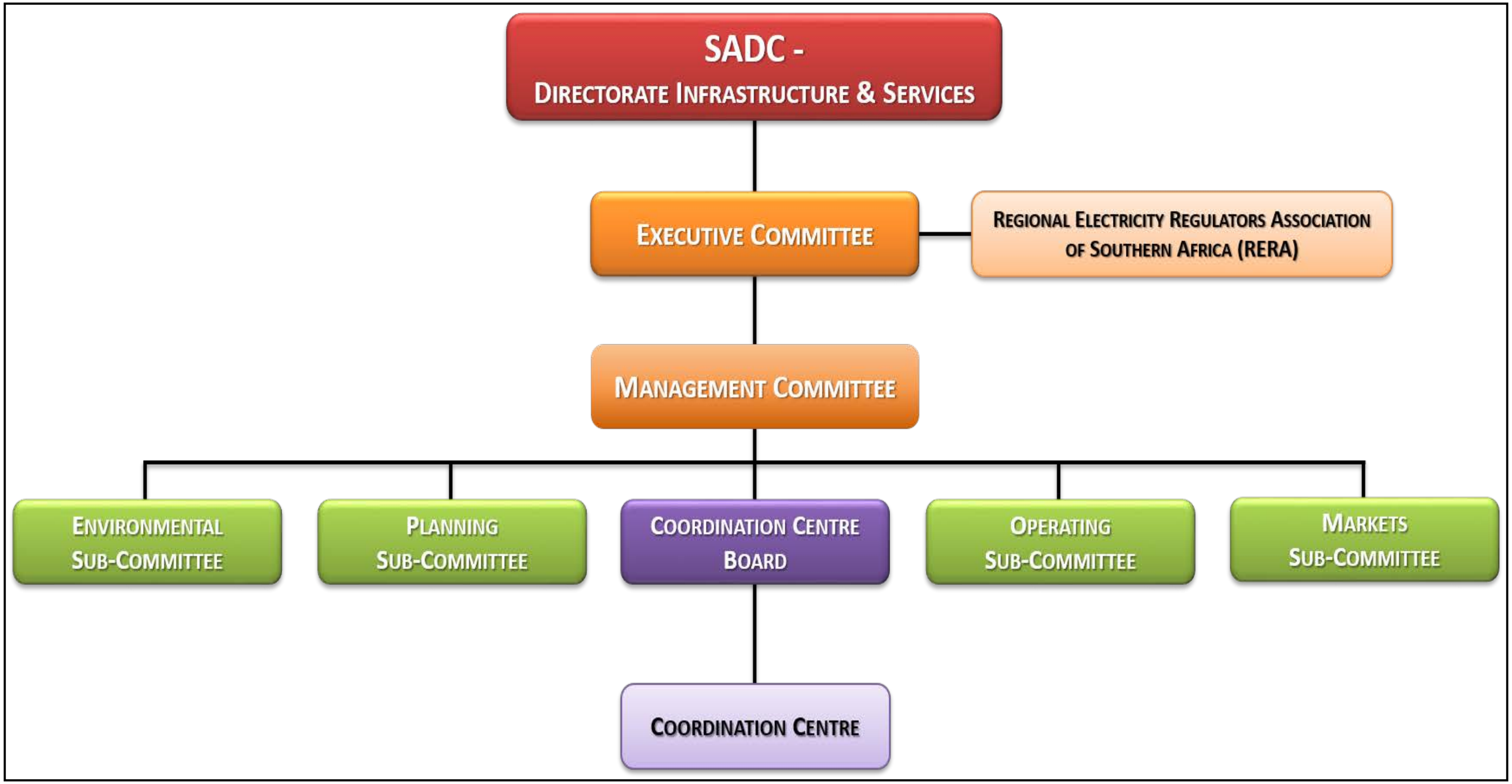

Figure 2-1: SAPP reporting structure

Table 2-1: Roles and responsibilities of the SAPP reporting structure

Structure	Roles and Responsibilities
SADC DIS	SADC Government Ministries and Official are responsible for policy matters normally under their control within the national administrative and legislative mechanisms regulating the relations between the Government and the national power utility.
SAPP Executive Committee	The Chief Executives of the member utilities and a representative from the SADC Secretariat form the Executive Committee. The committee refer matters such as requests for membership by non- SADC countries and major policy issues that may arise to the SADC Energy Ministers. A country with more than one utility would need to designate one utility to represent it on the Executive Committee.
SAPP Management Committee	The Management Committee oversees and decides on the recommendations of the sub-committees and the Coordination Centre Board.
SAPP Operating Sub-Committee	The Operating Sub-Committee consists of representatives from those power utilities already interconnected and exchange power on a major scale (there are presently nine countries interconnected). These are Botswana, South Africa, Zambia, Zimbabwe, DRC, Lesotho, Mozambique, Namibia and Swaziland. The duties of this committee include establishing and updating methods and standards to measure technical performance operating procedures including operating reserve obligations.
SAPP Planning Sub-Committee	The Planning Sub-Committee establishes and updates common planning and reliability standards, review integrated generation and transmission plans, evaluate software and other planning tools, and determine transfer capacity between systems.
SAPP Markets Sub-Committee	The Markets Sub-Committee is responsible for the design and continued development of the electricity market in the region and determines criteria to authorise this trade.
SAPP Coordination Centre	The Coordination Centre reports to the Coordination Centre Board consisting of a maximum of two representatives of each national power utility. Its function includes the implementation of SAPP objectives, provides focal point for SAPP activities, and provision of power pool statistics and maintaining a pool database for planning and development.
SAPP Environmental Sub-Committee	The Environmental Sub-Committee consists of environmental managers from each utility. The committee advises the SAPP on issues related to air and water quality, land use, climate change and renewable energy issues. The committee advises the Management, Planning and Operating Committees on standards and environmental management systems to ensue sustainable energy developments within the SAPP. Furthermore, the Environmental Sub-Committee's duties entail the following: • offer direction to the Management Committee on environmental matters; • keep abreast of world and regional environmental matters; • liaise with government environmental agencies and environmental organisations; • report all findings and recommendations to the Management Committee and Planning and Operating Sub-Committees; • provide a peer review to members of the SAPP in environmental management; and • carry out other functions and activities as assigned or approved by the Management Committee.

3 Overview of environmental and social context

Note: This section and Appendix C 1 provide a high-level overview of regional and national environmental and social baseline contexts within the SADC mainland where priority projects are located. These overviews although generic highlight key environmental and social features and sensitivities that may affect project planning. In addition, developing an early understanding of the project context will highlight potential opportunities and constraints posed by site conditions and flag future risks and impacts that would need to be studied and assessed. Key lessons learned on past energy projects in Africa are featured in Appendix C 2 for reference purposes.

3.1 Regional context

The Africa Environment Outlook 2 released in 2006 as well as the Southern African Environmental Outlook produced in 2008 provide a clear overview of the region's rich biophysical and socio-cultural attributes. More detailed data and situational analyses are presented in a suite of reference documents including the Millennium Ecosystem Assessment (2004), Zambezi River Basin Atlas (2012) and national state of the environment reports and resource databases. Collectively these reference documents map the environmental and socio-cultural resources of southern Africa, noting trends in the condition of these resources and highlighting key environmental and social challenges. Links to reference documentation is contained in Appendix B.

Comprising almost 10 million square kilometres, Southern Africa is endowed with abundant agricultural, mineral and other natural resources. Despite a highly variable rainfall and susceptibility to drought, countries within the region rely heavily on their renewable and non-renewable natural resources for economic development and livelihoods. The snapshot that follows is extracted from the 2008 Southern African Environmental Outlook and 2012 Overview of the Southern African Environment, both of which were prepared by the Southern African Institute for Environmental Assessment:

- **Freshwater resources** – Freshwater resources in Southern Africa are vital for sustainable economic and social development. Over 70% of these resources are found in shared watercourses and are unevenly distributed across the region due to high rainfall variability. In dryland areas covering large parts of Southern Africa freshwater resources are also constrained by the ever-present threat of drought. Given that water is essential to livelihood security and hence is often fraught with conflict; arid and semi-arid countries are subject to growing demand for water resulting in competition between the economy, society and environment. Many of the countries in Southern Africa are water-deficit economies, with most of the major watercourses in the region reported to be suffering from degradation and over-abstraction. The shortage of surface water means that groundwater is heavily exploited in some countries, where viable resources are available;
- **Soils and agriculture potential** – Soils, along with climate and topography, are a key determinant in agricultural potential. Although land degradation is believed to be increasing in most parts of southern Africa, the exact rate at which this is occurring is very difficult to assess. Natural drylands in Botswana, Namibia, South Africa, southern Angola, Mozambique, Tanzania, Zambia and western Zimbabwe are most susceptible to the manifestations of land degradation such as soil erosion, soil salinisation and bush encroachment. These areas are mainly comprised of savannahs and characterised by erratic rainfall patterns and fragile soils;
- **Biodiversity** – Southern Africa's species diversity has only partly been documented, however it is safe to say that SADC has a large and diverse biological heritage. The Global Forest Resource Assessment in 2000/1 reported that woodlands and forests covered 38% of the total land area of the region, equating to over 9.8 million square kilometres, with DRC being the most densely

forested area in the region. These woodlands and forests play a vital role in providing important resources and life-supporting services, although many of these areas are under threat from deforestation. Many rural communities are dependent on wild products for medicine and sustenance; wood is an important source of fuel and building material and game meat and fish provide people's protein requirements. The region has a number of world-class game reserves and national parks that draw tourists to view wildlife herds in their natural environment. Wildlife herds that migrate seasonally between countries in the region are valuable shared resources;

- **Wetlands** – There are extensive wetland systems in the southern African region and these often occur along major riverine systems and Rift valley lakes as well as estuaries and pans. As with the wetlands of the Okavango Delta in Botswana, these areas display rich and unique biodiversity and their productivity provides the natural resources essential to the survival of many rural populations. Collectively, wetlands support a wide range of ecosystems each with great diversity of plants, birds, fish and mammals. However, wetlands and their associated plant and animal life are under increasing pressure from agriculture, deforestation, alien invasive weed infestation, water pollution and over-utilisation of surface water;
- **Fisheries** - Freshwater fisheries are the main source of income and protein for millions in southern Africa. Southern Africa's large lakes, particularly Lake Victoria and Lake Malawi/Nyasa, support a large number of fishing activities. Studies conducted by the United Nations Food and Agriculture Organization in 2000 indicated that the DRC, Malawi, Tanzania and Zambia caught more than 90% of the total freshwater landings in the region. Today, these lakes are showing signs of overfishing and are also threatened by the introduction alien fish species such as the Nile perch introduced in Lake Victoria and alien invasive weeds like the water hyacinth, which disrupts water transport and supplies and threatens fishing activities and power generation;
- **Cultural heritage** - Each of the many peoples of Southern Africa possesses a unique way of life, embodied in their socio-political and economic systems, spiritual and ritual practices, material culture (including art, architecture, clothing and adornments), music, cuisine, and daily-life activities. Against the backdrop of this rich cultural heritage, the region also boasts archaeological sites that provide important knowledge of human evolution. For example, the Cradle of Humankind outside Johannesburg in South Africa is the site of ancient caves where scientists have discovered over one third of all the world's hominid fossils from between 3.3 and 1 million years ago. Among the most invaluable of the region's cultural treasures is the wealth of ancient rock art bequeathed to us by the hunter gatherer peoples such as the San and many archaeological structures and artefacts produced by extensive civilizations and kingdoms that were found across southern Africa. Many of these cultural heritage sites have been awarded world heritage status by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Presently, the region has over 30 registered world heritage sites; and
- **Human settlements** – Southern Africa's population is predominately rural, despite a high level of urban migration and some large cities of several million inhabitants, such as Kinshasa and Johannesburg. Settlements, large and small, are the locus of social and economic activity and often drive human and economic development. While most settlements in the region are planned, increasing population and rapid urbanisation has created challenges for the provision of adequate health and education facilities, housing, sanitation, safe water, electricity, waste disposal, roads and other social services. As a result, the region also has to grapple with issues of informal settlements and homeless people. These challenges are exacerbated by high levels of unemployment and poverty. It is therefore important that energy projects aim to alleviate poverty by enhancing the developmental benefits.

Figure 3-1 presents a regional map depicting key biophysical (e.g. major rivers, lakes, other wetlands, transfrontier and national parks) and socio-cultural features such as capital cities and world heritage sites.

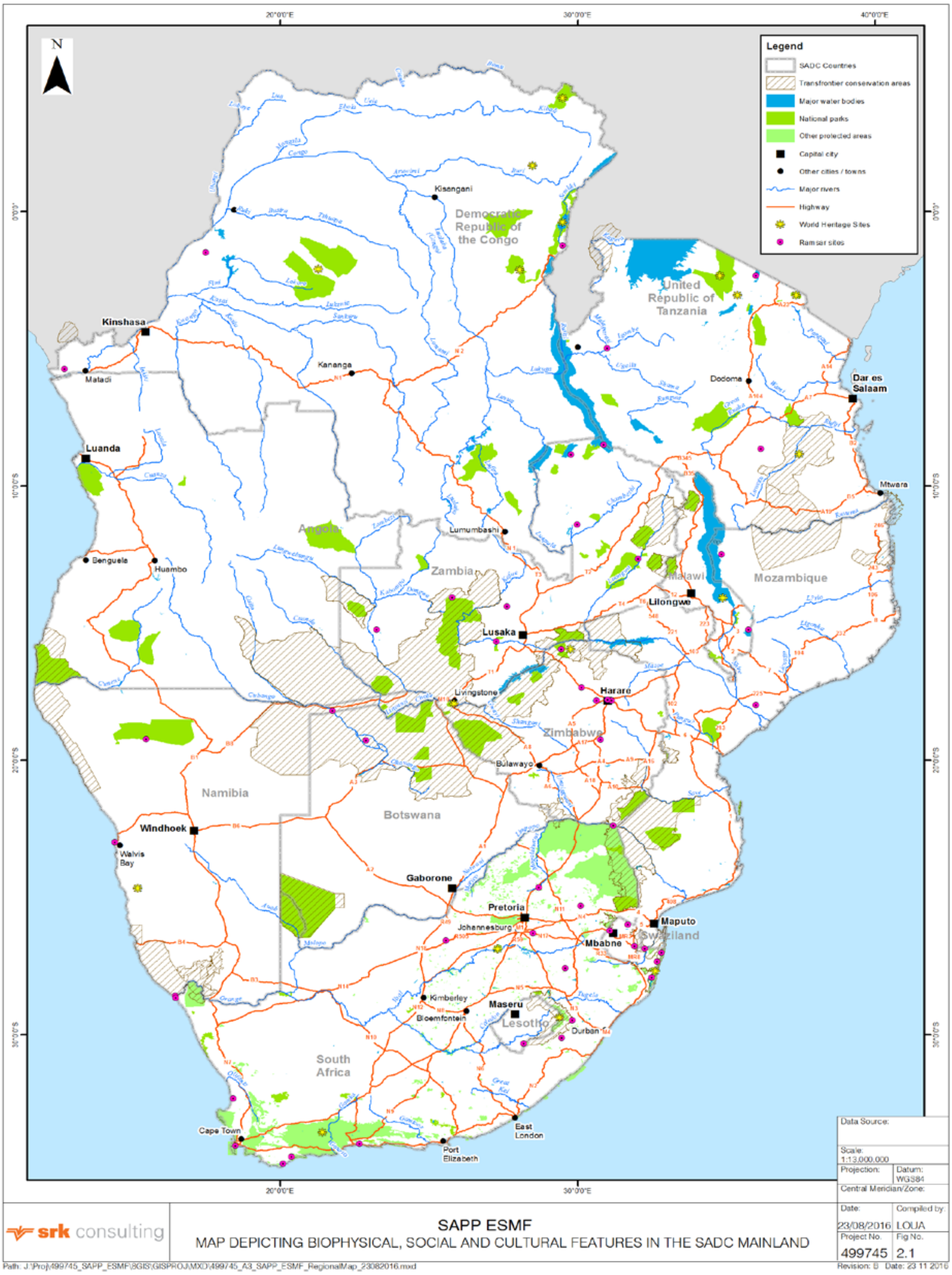

Figure 3-1: Regional map of key biophysical, social and cultural features on the SADC mainland

3.2 National context

The countries that comprise the SADC mainland have diverse environmental and social attributes. These national biophysical and socio-cultural features will pose opportunities and constraints to development. For example, establishing a hydro-electric scheme on a shared watercourse will most likely present economic benefits in host countries, but could also give rise to transboundary impacts such as flooding, disturbance to aquatic ecosystems and resettlement. Hence, being aware of a national environmental and social context will provide a “big picture” perspective, which will assist in identifying potential strategic risks and impacts during the concept and prefeasibility phases of the project development cycle (Section 6.2).

Appendix C 1 provides a high-level overview of the national environmental and social baseline features in SAPP member states in SADC, which is supported by maps for each country.

3.3 Project context

Every project has a unique context. Understanding the site conditions of a proposed project is critical to identifying and addressing at an early stage any potential environmental and social fatal flaws, risks and impacts. This understanding will largely be informed by visiting the proposed project site/s to determine local conditions (Step 1 in Section 6.4 provides more information on project screening). The environmental, social and institutional contexts in a project area should be viewed as both a constraint and an opportunity. Appendix C 1 provides an overview of national baseline biophysical and socio-cultural conditions, including supporting maps, for reference purposes. This information will assist in identifying potential constraints and opportunities during the project concept phase.

Project development stakeholders can learn from the lessons experienced on past energy projects in Africa. Challenges and issues that arise during the development of these projects can, to a significant extent, be foreseen and hence avoided reducing the chance of project delays, increased costs and proactively identifying environmental and social risks and impacts.

Appendix C 2 provides a table presenting the high-level lessons learned and best practices on a range of energy projects in Africa.

4 Relevant national and international policies and regulatory frameworks for environmental and social management

4.1 National regulatory frameworks

Note: This section and Appendix D present the applicable environmental and social legislation of the countries where priority power projects are located. The list is not exhaustive but features the key legislation governing environmental and social impact assessment as well as sectoral policies and legislation of relevance to priority power projects. Based on the location and scale of the proposed project it may be necessary to consider other laws and policies.

This ESMF is intended to benefit SAPP priority power projects through pre-feasibility, feasibility, planning and design studies initiated by member utilities. It will therefore largely be guided by the various national environmental and social legal frameworks. Legal frameworks for environment in the SAPP member states include a suite of policies and laws governing the protection and management of natural resources. There are also policies and laws that govern the protection of citizens' health and safety from activities that pose safety risks and can pollute and/or degrade the environment hence endangering human health and livelihoods.

Many mainland SADC countries have developed policies and promulgated laws for the management of natural resources, including air quality, land, water, biodiversity, forests, agriculture, fisheries and cultural heritage. They have also developed policies, laws and plans dealing with gender, HIV/AIDs, compensation and involuntary resettlement and marginalized peoples' rights. Every country in the SADC region has passed dedicated environmental policies and/or legislation.

Table 1 in Appendix D provides a summary of the national environmental and social legislation comprising sectoral policies and laws. The summary draws on the SADC environmental legislation handbook prepared by the Southern African Institute for Environmental Assessment (SAIEA) in 2012 as well as information pertaining to relevant policies, laws and decrees referenced by, or received from, representatives of SAPP utilities and IPPs and government organisations during interviews.

4.2 Regional and international regulatory frameworks

Note: This section presents a high-level overview of regional and international policies, charters, conventions, protocols and agreements that have an environmental and social focus and may be relevant to the priority power project. The list is not exhaustive but a number of the key SADC and African Union policy frameworks as well as multi-lateral environmental agreements approved by the United Nations for ratification by member states. During the project development process, the list needs to be expanded to ensure that it reflects the situation at the time.

In addition to the legislation that require environmental and social assessments in SAPP member states, there are a number of regional and international regulatory frameworks governing environmental and social sustainability. The United Nations, the African Union and SADC are the main organisations governing these regional and international regulatory frameworks.

Table 4-1 provides a list of some of the key conventions, protocols, charters and policies that guide regional and international cooperation on issues pertaining to environmental and social sustainability. The details of all the various conventions, treaties and/or multi-lateral environmental agreements (MEAs) that each of the SAPP member states are signatories to can be found at http://www.au.int/en/treaties and https://www.informea.org/en/countries. Appendix D highlights the national poverty reduction strategies of the SAPP member states.

The United Nations Environmental Programme (UNEP) is responsible for the governance and coordination of MEAs and works closely with contracting states to facilitate implementation. At continental level, the New Partnership for Africa's Development (NEPAD Agency) of the African Union coordinates frameworks and associated programmes and projects pertaining to regional integration infrastructure, including energy and natural resource governance. In Southern Africa, directorates in the SADC Secretariat assist with strategic coordination and integration of initiatives for infrastructure development and natural resource management, amongst other areas.

Table 4-1: Key regional regulatory frameworks

Convention, Protocol, Charter and Policy	Objective of the regional regulatory framework
United Nations regulatory frameworks (There are over 500 MEAs registered with the United Nations. Many SADC member states have acceded to a range of these MEAs. These agreements require country-level commitments that can be fostered through a cooperative regional approach).	
Convention to Combat Desertification (1994)	The Convention aims to improve the living conditions of vulnerable populations living in arid, semi-arid and dry sub-humid areas.
Convention on Biological Diversity (1994)	The Convention aims to encourage sustainable development that considers biodiversity. Some of the strategies in place to achieve this are to decrease the rate of loss of natural habitats, establish conservation areas, restore degraded areas and protect environments susceptible to human impacts.
United Nations Framework Convention on Climate Change (1992)	The Convention aims to limit human activities contributing to climate change and to come up with solutions to curb the negative results of climate change.
Basel Convention (1989)	The Convention controls the transboundary movement of hazardous wastes and their disposal methods.
Convention on International Trade in Endangered Species of Fauna and Flora (1975)	The Convention aims to ensure that the international trade of specimens (fauna and flora) does not threaten their survival.
Rotterdam Convention (1998)	The Convention aims to limit the trade of certain hazardous chemicals in order to protect human health and the environment.
RAMSAR Convention (1971)	The Convention aims for international cooperation and national action to protect wetlands and their resources.
Declaration of Commitment on HIV/AIDS (2001)	The Declaration aims to review and address the problem of HIV/AIDS in all its aspects as well as to secure a global commitment to enhancing coordination and intensification of national, regional and international efforts to combat it in a comprehensive manner.
United Nations Office of Partnership Report (2015)	The aim of the partnership is to examine options for funding various issues including: global health, women, girls and populations, advocacy, partnerships advisory and outreach services.

Convention, Protocol, Charter and Policy	Objective of the regional regulatory framework
United Nations on Combating Poverty (1997)	The aim is to ensure that all individuals are provided with the opportunity to earn a sustainable livelihood. In order to achieve this the UN will need to implement policies and strategies that promote adequate levels of funding and focus on integrated human development.
United National Global Compact	To encourage businesses worldwide to adopt sustainable and socially responsible policies, and to report on their implementation. Its primary objectives are to mainstream its ten principles in business activities around the world catalyse actions in support of broader UN goals, such as the Sustainable Development Goals (SDGs).
OAU/African Union regulatory frameworks (many African states have signed, ratified and/or acceded to conventions and charters and policies).	
African Convention on the Conservation of Nature and Natural Resources (2003)	The founding principle required contracting African States to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and faunal resources in accordance with scientific principles and with due regard to the best interests of the people.
Charter for African Renaissance (2006)	One of the key guiding principles of the Convention is to preserve and promote the African cultural heritage through preservation, restoration and rehabilitation. Article 5 commits African States to defend minorities, their cultures, their rights and their fundamental freedoms.
African Charter on Human and Peoples' Rights (1986)	The member states of the Organization of African Unity parties to the present Charter shall recognize the rights, duties and freedoms enshrined in this Chapter and shall undertake to adopt legislative or other measures to give effect to them. Article 24 states that all peoples shall have the right to a general satisfactory environment, favourable to their development.
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991)	The Parties to the Convention were required to institute appropriate legal, administrative and other measures within their areas of jurisdiction to prohibit the import and transboundary movement of all hazardous wastes to address the growing threat posed to the environment and human health.
SADC regulatory frameworks (SADC coordinates cooperation between member states on issues of mutual interest).	
Protocol on Forestry (2002)	The SADC Protocol on Forestry of 2002 aims to promote the development, conservation, sustainable management and utilisation of all types of forest and trees; trade in forest products and achieve effective protection of the environment, and safeguard the interests of both the present and future generations.
Protocol on Fisheries (2006)	SADC recognises the important role of fisheries in the social and economic well-being and livelihood of the people of the region, in ensuring food security and alleviating poverty. Therefore, to support national initiatives taken and international conventions for the sustainable use and protection of the living aquatic resources and aquatic environment of the region, SADC member states signed the Protocol on Fisheries in 2001.

Convention, Protocol, Charter and Policy	Objective of the regional regulatory framework
Revised Protocol on Shared Watercourses (2000)	Southern Africa relies on agriculture for its subsistence, as such water is of special concern for SADC. Many watercourses in the region are shared among several member states, a situation that demands their development in an environmentally sound manner. To this end, SADC initially passed its Protocol on Shared Watercourses in the Southern African Development Community on 28 August 1995, which was revised on 7 August 2000.
Protocol on Wildlife Conservation and Law Enforcement (1999)	Wildlife resources in Southern Africa have the potential to affect the region's economic development and environmental protection – two primary concerns of SADC. Therefore, SADC passed its Protocol on Wildlife Conservation and Law Enforcement on 18th August 1999 to establish a common framework for conservation and sustainable use of wildlife in the region.
Protocol on Energy (1996)	The SADC Protocol on Energy of 1996 intends to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region.
SADC HIV and AIDS Strategic Framework (2010-2015)	The aim is to ensure that challenges around HIV and AIDS in the region are addressed. Whilst ensuring that SADC member states mobilise resources and systems that allow for comprehensive scaled up, sustainable response to HIV and AIDS.
Compendium of Key documents relating to Human Rights and HIV in eastern and southern Africa (2008)	The aim is to address issues around human rights, gender and HIV and AIDS in the eastern and southern Africa. Thereafter providing mitigation measures/ plans to address these issues.

4.3 International funder safeguard policies, standards and guidelines triggered by the priority power projects

Note: Projects seeking international funding will need to take account of the specific environmental and social requirements of international financial institutions. Cognisance needs to be taken of the requirements of various financial institutions that may provide finance during any stages of a project (e.g. feasibility vs. construction).

This section presents a list of international financial institutions currently funding energy projects in SAPP member states and highlights their respective environmental and social safeguard requirements.

A range of international financial institutions[1] invest in energy projects in Southern Africa. Many of these institutions apply environmental and social policies, standards and/or guidelines when funding projects to identify and manage potential environmental and social risks and impacts. This section features the safeguard instruments of a number of leading financial institutions that are currently funding and planning to fund public and private sector power projects in SAPP member countries.

[1] Institutions deemed to have dedicated safeguard policies, standards and/or guidelines for specific aspects if these are formally documented, publicly available and included measurable criteria. High-level policy commitments were not considered as they provide insufficient detail for the SAPP utilities and IPPs to plan and implement ESIAs against.

For reference purposes, Table 2 of Appendix D provides more detail regarding the specific policies, standards and guidelines of these financial institutions. Use this list as a starting point when preparing terms of reference for feasibility studies and when considering engagement with potential funding partners.

4.3.1 World Bank

The World Bank projects and activities are governed by a number of Operational Policies that ensure economic, financial, social and environmental soundness. The World Bank Safeguard Policies can be found at *http://www.worldbank.org/en/programs/environmental-and-social-policies-forprojects/brief/environmental-and-social-safeguards-policies#safeguards* . The safeguard policies cover areas including: environmental assessment; indigenous peoples; involuntary resettlement; natural habitats; physical cultural resources; forests; safety of dams; and projects on international waterways.

The World Bank's Environmental and Social Framework (ESF), which was approved in August 2016 by the World Bank Board of Executive Directors, will take effect from October 2018 onwards and be applicable to projects to be funded by the World Bank. The ESF is available at *http://www.worldbank.org/en/programs/environmental-and-social-policies-for-projects/brief/theenvironmental-and-social-framework-esf#nextsteps* . The existing Safeguard Policies will run parallel with the ESF for a period of seven years, which continue to be applied to existing projects funded by the World Bank.

The General Environmental Health and Safety (EHS) Guidelines (available at http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines) were originally published by the World Bank in 2007 as a technical source of information during project appraisal activities. The EHS Guidelines is a reference document with general and industry-specific examples of Good International Industry Practice (GIIP). Following the 2012 update of IFC's Policy and Performance Standards on Environmental and Social Sustainability, it was decided to update the 2007 EHS Guidelines. This process commenced in 2013 and new EHS guidelines are being released following consultation, including those for the energy sector.

4.3.2 African Development Bank

The African Development Bank (AfDB) is a multi-lateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System, the AfDB is better equipped to address emerging environmental and social development challenges.

4.3.3 China Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. CDB provides development finance to African states and is committed to supporting projects that facilitate the development of new technology and boost sustainable economic and social development. Although it actively participates in global governance. CDB do not have dedicated environmental and social safeguards.

4.3.4 Development Bank of Southern Africa

The Development Bank of Southern Africa (DBSA) was established in 1983. The DBSA is a development finance institution wholly owned by the government of South Africa that seeks to *"accelerating sustainable socio-economic development and improve the quality of life of the people of the Southern African Development Community by driving financial and non-financial investments in the social and economic infrastructure sectors".* In September 2015 the DBSA revised its environmental and social safeguard standards. Their safeguards cover environmental and social assessment, protection of natural habitats, involuntary resettlement, community stakeholders and vulnerable groups, pest management, physical and cultural resources, safety of dams and labour.

4.3.5 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EPs), formally launched by the International Finance Corporation (IFC) in 2003. The EPs require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EPIII became effective from 4 June 2013. Further to other ongoing principles for environmental and social sustainability, the EPIII lays particular emphasis on energy management, transparency, as well as on human rights. Presently, approximately 80 commercial banks and financial institutions in 35 countries have voluntarily adopted the EPs, and a further 32 export credit agencies of OECD countries benchmark private sector projects against the EPs and IFC Performance Standards.

4.3.6 European Investment Bank

The European Investment Bank (EIB) is the official bank of the European Union (EU). The EIB is a public institution driven by the policy objectives of the EU and their principles of sustainable development, public participation, and accountability. The EIB aims to add value by enhancing the environmental and social sustainability of all the projects that it is financing and all such projects must comply with the environmental and social requirements of the Bank. In particular, climate change, biodiversity and ecosystems considerations are integrated into the lending policies and practices of the Bank (EIB 2007). The EIB has a range of policies and standards regarding its operations and relations with stakeholders, and one of these is the Environmental and Social Principles and Standards (EIB 2009). The *Environmental and Social Handbook* gives directions for environmental impact assessment (EIA), social impact assessment (SIA) and other assessments (EIB 2013). The EIB also applies the provisions of the EU's Environmental Impact Assessment Directive (European Parliament 2001). Similarly, the 1991 UNECE Convention on Environmental Impact Assessment in a Transboundary Context, known as the Espoo Convention, introduces specific rules for conducting an EIA of activities located on the territory of one contracting party, defined as the Party of origin, and likely to cause significant adverse transboundary impact in another contracting party, defined as the affected Party (Article 2) (European Commission 2013b). A guideline on how to include biodiversity and climate change issues in the EIA has been issued by the European Commission (European Commission 2013a).

4.3.7 International Finance Corporation

The IFC first published its Performance Standards on Environmental and Social Sustainability (IFC PS) in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in 2012. The IFC PSs cover the following: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5); biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7); and cultural heritage (PS8). The IFC has also prepared corresponding guidance notes for each of the performance standards as well as for energy generation types such as thermal, wind and transmission.

4.3.8 Japanese International Cooperation Agency

The Japanese International Cooperation Agency (JICA) was established in 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing. JICA have dedicated guidelines for environmental and social assessment for projects receiving funding, but often fund projects after the feasibility phase and consequently apply the requirements of other IFIs at times.

4.3.9 KFW Development Bank

KFW Development Bank (KFW) has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies from their conception, execution and monitoring. KFW is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations. It also considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change.

4.3.10 Swedish International Development Agency

The Swedish International Development Agency (SIDA) is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). A key mission is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focuses on the following areas: environmental assessment; biodiversity; indigenous peoples; involuntary resettlement; labour and safety; and forests and safety of dams (World Bank 2015b). SIDA has a guideline document for climate change and environmental cooperation. The Swedish Government has a body called the Swedish Energy Agency, which makes investments in Clean Development Mechanism and Joint Implementation Projects (STEMFS 2012).

5 Consultation and participation during the ESMF development

Consultation and participation were an integral component of the development of the ESMF. It aimed to ensure that the ESMF addressed issues that arise during the development of energy projects in the region. This consultation took the form of face-to-face meetings, telephonic interviews and workshops with stakeholder representatives. Table 5-1 provides a summary of consultation. Appendix L presents a summary of consultation and site visit reports.

5.1 Consultation and participation of SAPP structures

During ESMF development, a number of SAPP structures were consulted; SAPP-CC, SAPP-PAU and SAPP-ESC. Three workshops were held in Johannesburg, South Africa with the SAPP-ESC; the first focusing on planning of the ESMF development process, the second to present the draft ESMF and solicit comment and the third to present the updated ESMF. The SAPP-CC and SAPP-PAU were consulted on an ongoing basis regarding regional initiatives for cooperation on environmental and social management.

5.2 Consultation and participation of power utilities, independent power producers, government institutions and development finance institutions

Consultations were held with SAPP member power utilities, including IPPs, and their counterpart government institutions (i.e. respective ministries and departments governing energy and environment and environmental authorities responsible for reviewing ESIAs and issuing authorisations and/or licences). Missions were conducted to six SAPP member states, namely Democratic Republic of Congo (DRC), Mozambique, Namibia, South Africa, Tanzania and Zambia, to hold face-to-face meetings and conduct site visits to power generation and transmission facilities.

Telephonic interviews were conducted with the SAPP utilities, IPPs and their respective counterpart government institutions in the remaining SAPP member states (i.e. Lesotho, Malawi, IPP in Zambia and IPP in Mozambique). The interviews were guided by a set of questions to solicit an understanding of legislation, planning processes and institutional arrangements and capacity that influence the development and implementation of energy projects. A workshop was also held with representatives of development finance institutions (DFIs) in Johannesburg to present the draft ESMF and provide comment.

5.3 Consultation and participation of civil society organisations research institutions and funders

Consultations were held with representatives from CSOs, research institutions and funders involved in energy projects. Identified stakeholders were approached to participate in telephonic interviews. These interviews were guided by a set of questions aimed at ascertaining the nature of involvement in the energy sector in the region as well as key issues relating to the development and implementation of energy projects.

Table 5-1: Summary of consultation held during ESMF development (2016 and 2018)

Consultation event	Key stakeholders	Date of meeting
SAPP-ESC Consultative Workshop	**SAPP-ESC**	
	SAPP-CC, SAPP-PAU, SAPP Utilities	30 June 2016
In-country missions: Various meetings with select SAPP utilities and relevant ministries	**DRC**	
	SNEL	7 July 2016
	DRC Department of Environment	8 July 2016
	DRC Ministry of Energy and Hydraulic Resources	8 July 2016
	Mozambique	
	EDM	25 July 2016
	EDM Generation Directorate	26 July 2016
	Ministry of Energy	26 July 2016
	Ministry of Environment	26 July 2016
	Namibia	
	NamPower	1 August 2016
	NamPower Transmission Division	1 August 2016
	SAIEA	1 August 2016
	Environmental Commissioner	1 August 2016
	South Africa	
	Eskom	29 July 2016
	Tanzania	
	Ministry of Mines and Energy	14 July 2016
	NEMC	14 July 2016
	TANESCO	14 July 2016
	Zambia	
	ZEMA	11 July 2016
	Zambezi River Authority	11 July 2016
	ZESCO	11 July 2016
Telephonic interviews with select SAPP utilities and relevant ministries	**Botswana**	
	BPC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	12 July 2016
	Department of Environment: Manager/s responsible for environmental impact assessment	12 July 2016
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	12 July 2016
	Lesotho	
	LEC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	13 September 2016
	Department of Environment	13 September 2016
	Department of Energy	Utility was not able to arrange teleconference
	Malawi	
	ESCOM: Managers for Generation Planning, Transmission Planning, & Financial Transactions	Utility was not able to arrange teleconference

Consultation event	Key stakeholders	Date of meeting
	Department of Environment: Manager/s responsible for environmental impact assessment	
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	
	Mozambique	
	Managers for Generation Planning, Transmission Planning, & Financial Transactions	9 September 2016
	Swaziland	
	SEC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	27 September 2016
	Department of Environment: Manager/s responsible for environmental impact assessment	27 September 2016
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	27 September 2016
	Zimbabwe	
	Managers for Generation Planning, Transmission Planning, & Financial Transactions	Utility was not able to arrange telecon
	Ministry of Environment: Manager/s responsible for environmental impact assessment	
	Ministry of Energy and Power Development: Manager/s responsible for energy policy, strategy and planning	
Workshop with DFIs	**DFIs**	
	DFIs, SAPP-PAU	8 September 2016
SAPP-ESC Disclosure Workshop 1	**SAPP-ESC**	
	SAPP-CC, SAPP-PAU, SAPP Utilities	21-22 September 2016
In-country disclosure missions	**Disclosure Missions**	
	Zambia	17 October 2016
	Swaziland	1 November 2016
	Namibia	3 November 2016
	Mozambique	8 November 2016
	Botswana	11 November 2016
	South Africa	14 November 2016
	Tanzania	16 November 2016
Telephonic interviews with CSOs, research institutions, utilities and funders	**Organisations**	
	REDE TERRA	22 May 2018
	Smart Development Works (SNV)	24 May 2018
	Tanzanian Renewable Energy Association (TaREA)	25 May 2018
	Centre for Environmental Policy and Advocacy (CEPA)	25 May 2018
	Cabeolica	25 May 2018
	National Transportation Network (RNT)	30 May 2018
	University of Lubumbashi (UNILU)	31 May 2018
	German Development Bank (KfW)	31 May 2018
	The Council for Scientific and Industrial Research (CSIR)	5 June 2018

Consultation event	Key stakeholders	Date of meeting
	Technologies for Economic Development (TED)	12 June 2018
	Public Electricity Production Enterprise (PRODEL)	14 June 2018
SAPP-ESC Disclosure Workshop 2	**SAPP-ESC**	
	SAPP-CC, SAPP-PAU, SAPP Utilities	30 May 2018

5.4 Issues arising from stakeholder consultation

During the consultation process stakeholders identified a range of issues pertaining to the development and implementation of energy projects. Meeting notes and workshop proceedings are contained in the summary of consultation and site visit reports presented in Appendix L. Table 5-2 contains a high-level summary of the key issues raised by various stakeholder groups.

Table 5-2: Summary of key stakeholder issues during 2016 and 2018 consultations

Stakeholder Group	Key Issues
SAPP structures and utilities and IPPs	• Lack of integration between planning, engineering, finance and environment, health and safety (EHS) during project development; • Changing of management teams often results in the change of plans and delays implementation; • There is a lack of environmental and social capacity in a number of utilities - some utilities have dedicated departments or units with multiple staff responsible for the oversight of planning, environmental and social assessment, management and monitoring whilst others have one staff member; • The silo structure in certain utilities can constrain integrated planning; • Budget constraints pose challenges to utilities in meeting international environmental and social requirements; • Finances in utilities is a constraint - utilities do not have enough money to finance all phases of energy projects; • Many of the utilities have a limited understanding of the requirements of international funders, including issues relating to resettlement and compensation and climate change; • Some utilities have capacity building and training needs; • Safety is important and needs to be identified in the early planning stages to avoid delays, e.g. areas where there is unexploded ordinance; and • It becomes challenging when different funders are involved at various stages of the project development cycle as they may have unique funding requirements.
Government institutions	• There a lack of legislation in certain countries governing transmission infrastructure; • There is disconnect between national and lender ESIA requirements which need to be resolved to minimize delays in financing negotiations; • On transboundary projects such as transmission infrastructure, there is a need for increased communication between relevant state environmental regulators to ensure coordinated decision-making; • There is a lack of proactive engagement between national utilities, IPPs and relevant ministries; • Different impact assessment methodologies are used across the region, which is problematic for transboundary projects such as interconnectors; and • Environmental regulators have capacity constraints and sometimes lack understanding of international requirements.

Stakeholder Group	Key Issues
CSOs	• There is a lack of understanding by project proponents of local conditions; • Project alternatives are not identified at an early stage; • Vulnerable groups are not always acknowledged in the stakeholder engagement process; • Not all projects include the principles of inclusion, participation and transparency; • Projects are not always monitored. Monitoring needs to occur in line with environmental management plans; and • Environmental and social risks, including constraints arising from climate change, must be identified at an early stage.
DFIs and funders	• Funders need to be identified at an early stage to identify the relevant safeguard requirements and avoid delays; • Project development for energy infrastructure is generally very costly and if not carefully conceived and implemented, there is a possibility that important issues may be missed and need to be rectified with significant cost and time implications; and • Feasibility reports for a proposed project need to be more conclusive to obtain funding.
Research institutions	• Research needs to be undertaken to screen key locations for renewable energy and to identify key sensitivities; • Research should focus on the energy market to provide the most cost-effective technologies and efficient methods for implementation; and • Universities should be approached to assist utilities and IPPs with technical advice and review.

6 Environmental and social management framework

Note: The section below is primarily designed for application by environmental and social management and planning staff in the SAPP utilities and IPPs. It is crucial though that where internal expertise are not available, suitable external environmental and social experts should be appointed to assist with relevant components.

6.1 Introduction

The ESMF aims to assist project proponents to identify and manage the environmental and social risks and impacts through appropriate mitigation measures that may arise with the assessment of the priority power projects, in order to inform the design and engineering feasibility options. The successful implementation of the ESMF will depend on the commitment of the SAPP utilities and in-country regulators, the capacity within these institutions and appropriate institutional arrangements in these entities. It also requires that the development cycle of projects align with environmental and social assessment procedures to ensure that: (1) there is early engagement between project planners and compliance staff responsible for environmental and social management; and (2) the requirements of relevant financial institutions are identified prior to commencing an environmental and social assessment. This approach will ensure that the material risks and impacts are identified at the planning stages of the project development cycle, thus ensuring that environmental and social feasibility studies are appropriately scoped. A suite of tools is available to guide SAPP utilities through the environmental and social screening, strategic environmental and social assessment (SESA)[2], scoping, assessment, management planning and monitoring processes. These take the form of checklists, lists of national, regional and international environmental and social requirements as well as examples of terms of reference and management plans, amongst others.

Figure 6-1 provides a schematic of the ESMF showing the linkages between project development and environmental and social impact assessment procedures. It highlights the tools that are contained in the ESMF. These various elements of the ESMF are elaborated upon in this section.

Note: Financial institutions that may provide finance during any stages of a project should be consulted at the earliest stage, where practically possible, to pro-actively identity their environmental and social requirements.

[2] A SESA is conducted when the project needs to systematically examine broader environmental and social risks and impacts, and issues, associated with a policy, plan or program, typically at the national/regional level but also in smaller areas. The examination of environmental and social risks and impacts will include consideration of the full range of environmental and social risks and impacts. SESA helps integrate environmental and social considerations into the preparation and adoption of policies, plans or programs and promotes sustainable development. SESAs are typically not location-specific. They are therefore prepared in conjunction with project and site -specific studies that assess the risks and impacts of the project.

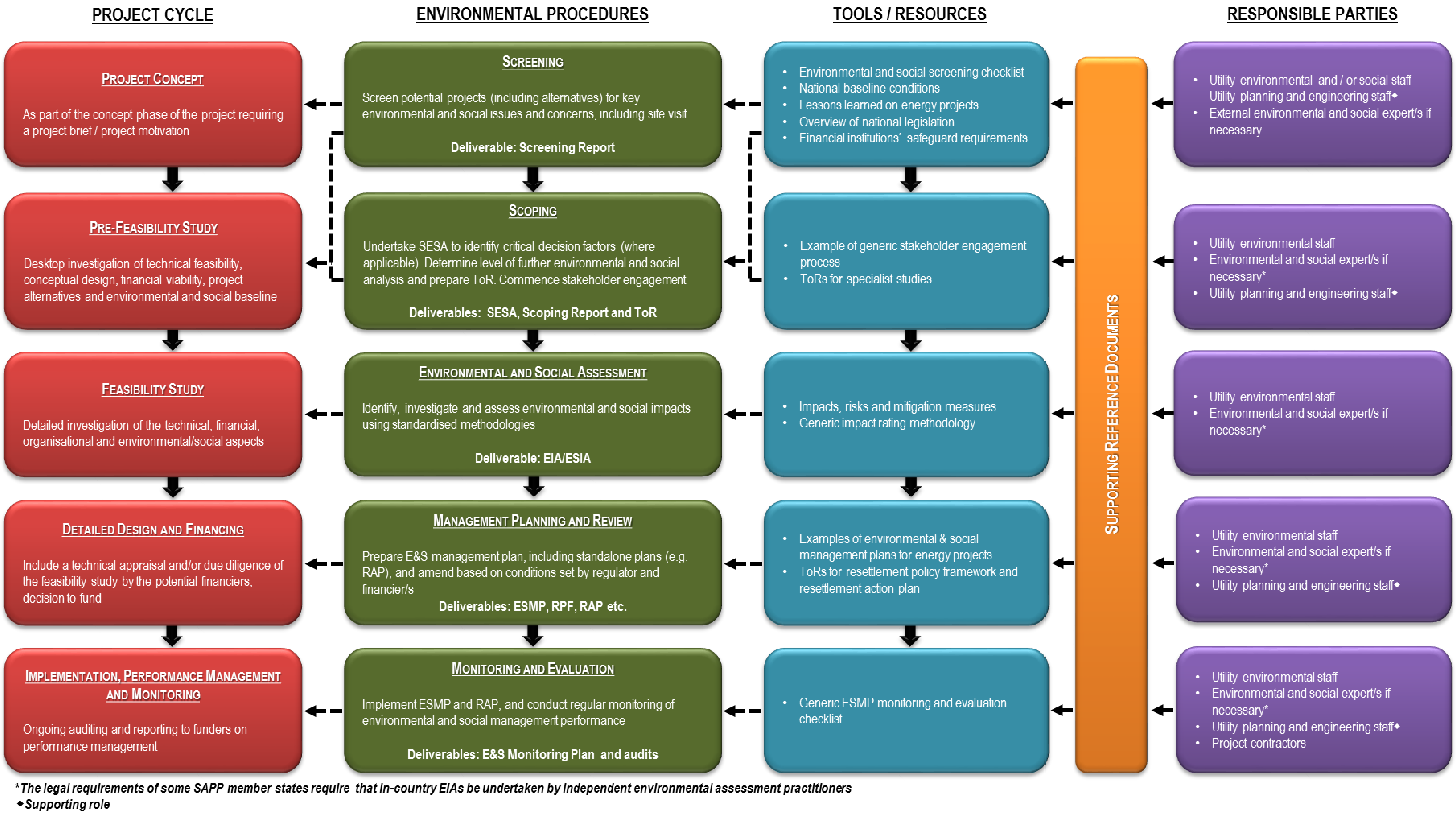

Figure 6-1: Schematic of the ESMF

6.2 Project development cycle

<u>Note:</u> During the development cycle the SAPP utility should -

1. Involve environmental and social staff at the earliest planning stage to ensure that key risks and impacts relating to a proposed project are identified.
2. Ensure strong linkages between the engineering process and the environmental and social impact assessment process.
3. Screen project alternatives.
4. Undertake a SESA where applicable to assess strategic options, opportunities and risks relating to the proposed project alternatives to identify critical decision factors.
5. Involve potential funders as early as possible in the process to ensure that their expectations and requirements are identified.
6. Identify the environmental and social safeguard requirements of relevant financial institutions prior to commencing an environmental and social impact assessment.

The SAPP utilities follow a similar process when developing a greenfield or brownfield priority energy project. The general project development cycle comprises the following phases: (1) identification, (2) pre-feasibility study, (3) feasibility study, (4) detailed design and financing, and (5) implementation, performance management and monitoring. These are outlined below:

- **Project identification:** At the outset, utility planners and engineers identify project options and alternatives to address national energy priorities. The investigation process generally culminates in a project brief that includes a motivation for the project, which should take account of environmental and social constraints and opportunities;
- **Pre-feasibility study:** After approval by policy makers and executive management, the utility planners and engineers proceed to pre-feasibility. This phase generally involves desktop investigation of design, technical, financial and environmental and social issues pertaining to the proposed priority power project. In instances where utilities have environmental and social staff with in-depth specialist expertise, these personnel will conduct site visits to gather additional information, which will inform engineering decisions. Where such expertise is lacking in the utility, external experts should be appointed to undertake a site visit with utility staff to assist this process. A SESA can be undertaken to evaluate strategic project options and alternatives, opportunities and risks informing project selection, siting and/or route alignment;
- **Feasibility study:** Following approval of the pre-feasibility study and findings of a SESA (where applicable), detailed feasibility investigations commence, including ESIAs of selected project alternatives. These studies generally respond to the legislative requirements of the country where the project is situated. For transmission projects where the powerlines traverse more than one country, multiple ESIAs will be conducted to meet the requirements of each participating country. In such instances, co-ordination between countries on the evaluation and selection of preferred route alignments must be implemented. Technical and financial studies are prepared in parallel with the ESIAs, necessitating strong linkages between the engineering, finance and assessment teams. It can take several years to finalise the feasibility phase of a project;
- **Detailed design and financing:** Assuming the project is technically feasible and financially viable, and national environmental authorisations and permits have been obtained, utilities will proceed to the detailed design and financing phase. It is at this stage that the utility will approach financial institutions such as development and commercial banks and donor agencies for funding for the construction phase. These institutions will generally conduct appraisals and due diligences of feasibility studies to ensure that their requirements are addressed. A key focus of the appraisal process is on the environmental and social assessment of project impacts. The in-country ESIAs are reviewed to determine if they meet environmental and social safeguard requirements. Often,

utilities are required to update the existing ESIA documentation and conduct additional environmental and social studies. In many instances, potential funders require utilities to undertake resettlement planning to ensure project affected parties are appropriately compensated for economic and/or physical displacement. The issue of compensation is often a major constraint as development financial institutions generally do not cover the cost for compensation and the utility often does not have the budget to address this issue. Depending on project viability, certain DFIs, such as the World Bank, may cover cost of compensation. The need to address gaps in the environmental and social feasibility studies and the lack of budget to cover compensation means that the project cannot proceed to bankability. These issues have delayed many SAPP priority power projects from achieving bankability; and

- **Implementation, performance management and monitoring:** Only after the lenders' environmental and social safeguard requirements have been addressed, can the utility proceed to contract finalisation. In order to implement a project, the utility will procure the services of suitable engineering and construction management firms. The utility is also responsible for ensuring that contracted parties meet the scheduling, technical and environmental and social management requirements of the project. Performance management is a critical aspect of project implementation as the utility is generally required to report back to project funders on progress. When projects are being funded by international development institutions such as the World Bank, EIB and AfDB and/or commercial banks that are signatories to the Equator Principles, the utility is required to demonstrate how the environmental and social impacts and risks are mitigated and managed in accordance with the environmental and social standards and policy requirements of the funder/financer. This may include the funder's prior review and approval of ToR, ESIA, ESMP and other assessments and plans prepared for the individual project. Often, the funders will require independent regular environmental and social reviews/audits of project performance, which at times, can comprise a full panel of relevant experts.

6.3 Strategic environmental and social assessment (SESA)

A SESA is conducted when the project needs to systematically examine broader environmental and social risks and impacts, and issues, associated with a policy, plan or program, typically at the national/regional level but also in smaller areas. The examination of environmental and social risks and impacts will include consideration of the full range of environmental and social risks and impacts. SESA helps integrate environmental and social considerations into the preparation and adoption of policies, plans or programs and promotes sustainable development. SESAs are typically not location-specific. They are therefore prepared in conjunction with project and site -specific studies that assess the risks and impacts of the project. In the context of SAPP, a SESA would be a useful tool when determining the wider environmental and social implications of a priority power project and informing project selection, siting and/or route alignment. It can support the identification of project opportunities, help prevent costly mistakes, facilitate transboundary cooperation, assess climate change relevance and safeguard environmental and social assets for poverty alleviation. The SESA, once complete, would serve as a framework for ESIAs of individual priority power projects.

The SAPP utilities and governmental institutions highlighted the need for regional environmental studies for the following issues:

- SESA for transboundary transmission projects to inform routing and ensure alignment between national environmental regulators;
- SESA of greenfield hydroelectric power projects to ascertain the regional environmental and social upstream and downstream effects; and
- SESA of geothermal resources to guide the siting of power plants.

For further information pertaining to an SESA process and its applications, refer as a starting point to the World Bank's 2008 publication *Strategic Environmental Assessment for Policies. An Instrument for Good Governance* and the OECD 2006 publication *Applying Strategic Assessment. Good Practice Guidelines for Development Co-operation* listed in Appendix B.

6.4 Environmental and social assessment procedures

Note: During the environmental and social assessment process the SAPP utility should -

1. Conduct screening using the checklist of environmental and social risks and potential impacts to inform selection of site alternatives.
2. Ensure that the scope of work for the environmental and social feasibility studies for selected site alternatives are suitably comprehensive and cover both in-country laws as well as safeguard requirements. As a starting point, consult overviews of environmental and social requirements as well as the terms of reference for specialist studies for different energy projects, including stakeholder engagement planning and resettlement policy framework.
3. Apply standardised methodologies during the environmental and social impact assessment stage to ensure that all relevant impacts (both positive and negative) have been identified and assessed.
4. Prepare environmental and social management plans for the energy project as well as requisite additional plans to address the safeguard requirements of regulators and funders such as resettlement action plan. As a starting point, consult the management plan examples ensuring that they are adapted to reflect project specific conditions.
5. Conduct stakeholder engagement throughout the process guided by regulatory and funder requirements. Consult the stakeholder engagement process example when designing the engagement process for the project during the scoping stage.
6. Based on the environmental and social monitoring plan for the project, develop a monitoring schedule using the template provided to support performance management.

An environmental and social impact assessment (ESIA), also referred to as an environmental impact assessment (EIA), is conducted to identify and predict environmental and social impacts prior to project execution. The International Association for Impact Assessment. (IAIA) defines ESIA as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. The ESIA process includes an assessment of positive and adverse environmental and social impacts and measures of project alternatives (e.g. location, technology project design, layout and routing) as well as costs for mitigating adverse impacts. It also defines the degree to which the benefits of the potential priority power projects will be distributed in an equitable manner across the affected population. Social assessments examining opportunities to enhance social inclusion, social accountability, strengthen social cohesion, increase social capital, and build ownership, form a key part of the ESIA process. Stakeholder engagement is a key requirement of an ESIA process. It usually takes place during the scoping and impact assessment stages of ESIA process to provide notification of the proposed project to stakeholders, identify their issues and concerns and obtain feedback on findings.

An analysis of ESIA processes in the SADC countries undertaken by the Southern African Institute for Environmental Assessment in 2012 identifies components and procedures that are common to the majority of countries. Broadly, ESIA procedures include screening and scoping, approval of terms of reference, environmental assessment, preparation of environmental management programmes and/or plans, public consultation and review, regulatory review, monitoring and auditing.

Energy infrastructure projects (e.g. thermal power facilities, solar power plants, wind farms and geothermal power plants) are generally categorised in terms of national environmental law as activities requiring full environmental assessment. Similarly, most international financial institutions assign a Category A rating to these power projects as they can potentially cause significant and irreversible impacts. Table 6-1 provides a high-level comparison of ESIA process requirements between SAPP member countries.

Table 6-1: Comparison of EIA procedures in SAPP member countries

Country	Environmental regulator	EIA regulations	Screening	Scoping	EIA/ EIS/ESIA	Permit/licence authorisation*	Validity period (yrs) of permits*	EMP/ESMP	Monitoring & Evaluation	ToR drawn up by proponent (no review)	ToR drawn up by proponent (authority review)	ToR by authorities	Public consultation required in scoping	Public consultation required during preparation of EIA	Public review and/or public hearings after EIA report completed	Appeal Process
Angola	✓	✓	✓	x	✓	✓	-	✓	✓	✓	x	x	x	x	✓	✓
Botswana	✓	✓	✓	✓	✓	✓	-	✓	✓	x	✓	x	✓	x	✓	✓
DRC	✓	✓	x	x	✓	✓	-	✓	✓	x	x	x	x	✓	x	x
Lesotho	✓	✓	✓	✓	✓	✓	-	✓	✓	x	✓	x	x	x	✓	✓
Malawi	✓	✓	✓	✓	✓	✓	-	✓	✓	x	✓	✓	✓	✓	✓	✓
Mozambique	✓	✓	✓	✓	✓	✓	5	✓	✓	x	✓	x	✓	✓	✓	
Namibia	✓	✓	✓	x	✓	✓	3	✓	✓	x	✓	x	✓	✓	x	✓
South Africa	✓	✓	✓	✓	✓	✓	2-5	✓	✓	x	✓	x	✓	✓	x	✓
Swaziland	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	x	x	x	✓	✓	✓
Tanzania	✓	✓	✓	✓	✓	✓	3	✓	✓	x	x	✓	x	✓	✓	✓
Zambia	✓	✓	✓	✓	✓	✓	-	✓	✓	x	✓	x	✓	✓	✓	✓
Zimbabwe	✓	✓	✓	x	✓	✓	2	✓	✓	x	x	x	x	✓	x	✓

***Note**: The validity period of an environmental authorisation or permit varies from country to country and usually commence at the date the permit is granted. In instances where projects are transboundary (e.g. transmission lines connecting different national grids), it would be important to align the validity periods provided by the different competent authorities where possible. Should alignment not be possible between the authorisations/ permits, the utility would need to timeously request an extension to address any shortfall in time.

The ESIA procedures applied in SAPP member states generally align with the ESIA process required by the international funders of investment projects. The ESIA process comprises a series of steps, namely: impact screening; scoping; prediction and mitigation; management and monitoring; and finally auditing, which inform the project development cycle. These steps are described below and Figure 6-1 indicates how they link to phases of the project development cycle presented in Section 6.2.

Step 1: Environmental and social screening procedure

The purpose of screening is to determine whether projects are likely to have potentially significant negative and/or positive environmental and social impacts and to identify appropriate high-level mitigation/enhancement measures for activities with adverse impacts or benefits that need to be considered in the project design. Screening is also used to review and approve project proposals. This process usually corresponds with the project preparation phase of a development. The proposers (e.g. utility planners and engineers) of the priority power projects should complete an Environmental and Social Screening Checklist (Appendix E) to guide decision-makers.

The screening checklist will highlight the presence of biophysical and socio-economic features and constraints that may require future assessment and management. Additionally, it should identify political, institutional and safety and security risks to the proposed project and determine project categorisation, national legislative requirements and international standards and guidelines. The screening exercise must also identify, describe, and where necessary, consult with key stakeholders including marginalised and vulnerable groups and indigenous peoples within and surrounding the project footprint. This process will inform the selection of suitable alternative sites for further investigation. These findings should be reported to the project proponent.

Key outcome informing decision-making:

The project proponent should present the findings of the screening process in a Project Concept Document, which will represent the key deliverable of this step and may be reviewed by potential funders.

The proponent should utilise the screening results to inform key decisions in the project, including stakeholder engagement planning, consideration of alternatives, concept level design considerations and the schedule implementation arrangements.

After screening, the scoping process generally commences. If required, a SESA can be undertaken to evaluate strategic project options and alternatives, opportunities and risks informing project selection, siting and/or route alignment prior to scoping (Figure 6-1).

Step 2: Scoping procedure

Commencing after the completion of screening, and findings of a SESA where applicable, scoping is a critical stage in the preparation of an ESIA. It is usually conducted by environmental assessment practitioners appointed by the project proponent. Scoping is typically an open and interactive process of determining the major issues and impacts that will be important in decision-making on the proposal and needs to be addressed in an ESIA. Although the requirements and procedures established for this purpose differ from country to country, scoping provides greater resolution by determining which issues and potential environmental and social impacts are significant and require further study. In many ESIA procedures in SADC, the involvement of the public as well as the competent authority and other responsible government agencies, is an integral part of the scoping process. Public input helps to ensure that all important issues are considered when preparing ToRs and/or initiating the ESIA study. In this way, scoping ensures that ESIA specialist studies are focused on the significant effects of a proposed priority power project and have clearly defined temporal and spatial boundaries to investigate.

In addition, the scoping process can be used to help further define the feasibility of alternatives to a proposed project. Not all ESIA procedures in SADC make provision for the generation or review of feasible alternatives during scoping. These may follow, instead, from the issues that are identified as important. However, consideration of alternatives during scoping is accepted internationally as ESIA good practice. Generally scoping corresponds with the pre-feasibility and feasibility phases of the development cycle (Figure 6-1).

Scoping is complete when the Plan of Study for the ESIA and proposed detailed studies are specified in a scoping report (see specialist ToRs in Appendix F). The scoping report must be presented to the project proponent as its sets out what the ESIA must cover, the type of information to be submitted and the depth of analysis that is required. It provides guidance to the project proponent about how to conduct and manage the study. Experience shows that the ToRs for specialist studies should be flexible. They may need alteration as further information becomes available, new issues emerge during consultation, or in rare cases issues are reduced in importance.

Key outcome informing decision-making:

By identifying key environmental and social issues raised by stakeholders, the scoping report will assist the project proponent to focus resources on collecting the information necessary for decision-making relating to project design and layout considerations, development of ToRs and selection of suitable alternatives for assessments.

The project proponent should prepare comprehensive ToRs for the entire ESIA process (as opposed to only for specialist studies) as part of a request for proposal.

The SAPP utility may decide to recruit an external environmental consultant to conduct the ESIA[1] at this stage in the process, either due to a legal requirement to do so or the lack of an in-house team of assessment practitioners and specialists.

Step 3: Environmental and social assessment procedure

As SAPP priority power projects are likely to be registered as Category A after screening, it will be necessary to conduct a comprehensive ESIA of preferred site/s. The ESIA process will evaluate the likely environmental and social impacts of the proposed power project taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. Guided by issues identified during the scoping process, the project proponent will prepare detailed ToRs and follow the requisite procurement processes to contract a consultant to undertake the ESIA.

The SAPP utility will follow the mandatory ESIA process enacted in their host country but ensure that the scope of work meets the safeguard requirements of potential funders (Appendix D Table 2). The template ToRs in Appendix F are aligned with the following World Bank Safeguard Operational Policies (OPs):

- Environmental Assessment OP 4.01;
- Natural Habitats OP 4.04;
- Pest management OP 4.09;
- Indigenous peoples OP 4.10;
- Physical cultural resources OP 4.11;
- Involuntary resettlement OP 4.12;
- Forests OP 4.36; and
- Safety of dams OP 4.37.

The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. For example, in the event that a priority power project will cause physical and/or economic displacement, the SAPP utility will need to commission the preparation of a Resettlement Policy Framework (RPF) and/or Resettlement Action Plan (RAP), referring to the template ToR for involuntary resettlement. In another example, when the project will involve hydro dams, the specialist studies will need to cover the safety of dams, which are covered in the template ToR for the occupational and public health and safety.

Specialist studies will determine baseline environmental and social conditions of the project area. Drawing on technical data obtained from field surveys and monitoring and primary and secondary data sources, the specialists will predict the significance of identified impacts in terms of their likely magnitude, spatial extent and duration, prior to recommending measures to avoid, mitigate and/or manage potential environmental and social impacts. The findings of these biophysical, socio-economic and heritage studies, coupled with issues and concerns identified through the consultation process with stakeholders including people who may be affected by the project and other interested parties, will be analysed and integrated into the ESIA and other specialist studies, using a standardised impact assessment methodology (Section 7) to determine their significance.

The findings of the ESIA must be presented to the project proponent to ensure that they understand the significant environmental and social impacts arising from the proposed project.

Key outcome informing decision-making:

The ESIA findings will guide the proponent on decision-making aimed at mitigating and optimizing impacts arising from the proposed project. Decisions may, for example, need to be taken regarding detailed design and technology options to ensure greater resource efficiency of a specified power generation process; thereby reducing waste emissions and their associated impacts. Decisions on how to maximise socio-economic benefits to host communities should also be considered.

The proponent should utilise the information presented in the ESIA to inform the scope of dedicated management plans that will form part of a project-specific environmental and social management system.

Step 4: Management planning procedure

Management planning is an essential element of the ESIA reporting process that aims to translate mitigation and monitoring measures recommended by specialists and stakeholders into specific actions that will be carried out by the project proponent. More specifically, an environmental management and social plan (ESMP) is a project-specific plan developed to ensure that all measures are identified and implemented to protect the environmental, social cohesion and human health in compliance with environmental legislation and good practice standards. Depending on particular requirements stipulated by a regulatory authority or ESIA legislation, the ESMP may be included in or appended to the ESIA report or may be a separate document. Based on an analysis of environmental assessment requirements in SAPP member states (Table 6-1 and Appendix G), environmental management plans are mandatory when conducting an ESIA although the content varies from country to country. Some countries require additional management plans that need to be appended to the ESIA.

When developing an ESMP for a priority power project, the SAPP utility should make use of the examples of environmental and social management plans for different energy types presented in Appendix G. These examples can be used as a starting point in the management planning process. The ESMP document will need to be a living document that is used throughout the project life cycle.

Hence, it should be regularly updated to remain aligned with the project as it progresses from construction to operation and, finally to decommissioning and closure. The updating processes must ensure that evolving good practice and legal compliance is considered, particularly as standards, guidelines and legislation change.

In addition to addressing the legal requirements of national environmental and social laws, SAPP utilities will need to align and integrate environmental and social safeguard requirements of project funders. The ESMP document should include, plans for mitigation monitoring, institutional arrangements for implementation, capacity building and associated costs. Depending on the project specific impacts, and the funder safeguard requirements, SAPP utilities may need to develop a number of dedicated standalone management plans to manage adverse social impacts, physical and economic displacement, indigenous people and communication with stakeholders, amongst others. The environmental assessment and management planning steps will culminate in an ESIA report containing an ESMP as well as requisite management plans.

Based on the ESMP, an environmental and social monitoring plan must then be developed. The monitoring plan must include the following:

- The mitigation/management measures recommended in the ESIA;
- The person/organisation directly responsible for adhering to or executing the required mitigation/management measures;
- The person/organisation responsible for ensuring and monitoring adherence to mitigation/management measures;
- The parameters which will be monitored to ensure compliance with the mitigation/management measures; and
- A timescale for the implementation of the action to ensure that the objectives of mitigation and management are fully achieved.

Appendix K contains a generic ESMP monitoring and evaluation checklist.

Key outcome informing decision-making:
The ESMP and requisite standalone management and monitoring plans will inform decisions regarding organisational structure, staffing, roles and responsibilities and resource allocation.

Step 5: Information disclosure and stakeholder involvement

Public consultation is a core element and regulatory requirement that must be adhered to in environmental and social impact assessments. The SAPP utility and/or project proponent will ensure that consultation and communication take place and coincide with significant decision-making activities in the entire project cycle and that the process and issues are clearly documented and tracked. Consultation methods shall be participatory and take into account gender differences in time and work allocation (Appendix H contains an example of a generic stakeholder engagement process). Consultation and communication will be carried out at all appropriate levels from the local to the national and regional levels and stakeholder inputs will be documented and used to inform project preparation and improve project design. For all priority power projects, it shall be imperative to undertake or solicit public participation and consult project stakeholders at all levels during the ESIA process. Consultations for the ESIA shall be detailed and include the following:

- Identifying specific stakeholders, disclose relevant project information and determine stakeholder concerns to include them in the ToR (scoping and agreement on ToR and schedule);
- Disclosing information on study methods and findings, agree on mitigation measures with stakeholders and let stakeholders determine if their concerns are adequately addressed (environmental analysis and production of draft ESIA);

- Finalising mitigation plan and disclose to stakeholders (production of final ESIA reports);
- Informing the public about scheduling of potentially disruptive events, disclose results on environmental monitoring, and maintain effective complaints procedure (ESMP implementation and monitoring phase);
- Assessing effectiveness of consultation process and consult stakeholders for their assessment (final evaluation). The major tool to plan and implement consultation is the stakeholder consultation plan (Appendix H), which should propose a variety of consultation techniques as a function of the audience to reach;
- Informing stakeholders of the outcome of the review of the EIA/ESIA by the relevant regulator and the opportunities to appeal such decisions, or conditions thereof, if provided for via the in-country legislation; and
- Develop and implement a grievance management mechanism after the ESIA process that captures, and addresses issues and concerns raised by stakeholders during all project phases, e.g. pre-construction, construction, operation and decommissioning.

The ESIA documentation will be submitted to the relevant in-country regulatory authority (Appendix D) for decision-making. In the event that the regulatory authority approves the ESIA documents, the priority power project will receive an environmental authorisation or permit containing a number of conditions, which will need to be audited and reported on regularly. The authorisation/permit will most likely be valid for a set period from the date of issue, and construction activities will need to commence within this period to avoid the authorisation/permit lapsing.

The completion of the ESIA documents will generally align with the financing phase of the project development cycle and involve an appraisal by the potential funders to determine that all the relevant information has been provided and is adequate. If the appraisal indicates that the proposed project may have environmental and social concerns that are not adequately addressed in the ESIA, the reviewing authority may conduct a field appraisal before the application can be considered further. Based on the appraisal and, if needed, the field appraisal, the reviewing authority will approve the projects with recommended conditions and implementation supervision.

Step 6: Environmental and social monitoring and auditing

Based on the environmental and social monitoring plan for the project, a monitoring schedule should be developed using the template provided in Appendix I to support performance management.

Often, funders will require independent regular environmental and social reviews/audits of project performance, which at times can comprise a full panel of relevant experts.

Key outcome informing decision-making:
The proponent should use audit findings to identify and address areas where environmental and social management needs to be improved. In instances of non-compliance with approved management commitments, decisions may need to be taken to strengthen, amongst others, project reporting, staff capacity and operational procedures.

6.5 ESMF monitoring and evaluation

Monitoring and evaluation is a key component of the ESMF during the implementation of SAPP priority power projects. Periodic monitoring by the SAPP utility will ensure that management measures are being implemented to mitigate environmental and social impacts. Monitoring activities will allow the SAPP utility to: improve environmental and social management practices; check the efficiency and quality of the ESMP processes; establish the scientific reliability and credibility of the ESIA for the project; and provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation. SAPP utilities, with the assistance of SAPP-PAU, will conduct monitoring activities during the feasibility studies and ESIAs, aiming to appreciate the extent to which mitigation measures are successfully implemented. Monitoring will focus on following two key areas:

- Compliance monitoring - will verify that the required mitigation measures are considered and implemented. During the project preparation phase, compliance monitoring activities will focus on ensuring effective ESMF implementation. The environmental staff of the SAPP utility will ensure that ESIA process is properly and timely conducted in compliance with host country laws and funder safeguard requirements. The feasibility studies will also include an assessment of the conditions for implementation of a RAP, as appropriate. During the implementation phase, compliance monitoring would include inspections during construction of the project's components to verify the extent to which authorisation or permit conditions are being adhered to. The monitoring of environmental and social performance during project construction, operation and decommissioning will be the full responsibility of the respective SAPP utility, and the environmental authority will ensure that the priority power project complies with environmental and social conditions. SAPP-PAU will provide technical assistance as the need arises; and
- Impact monitoring – will be the ultimate responsibility of the SAPP utility who will need to report to the regulatory authority. The ESIA, ESMP, RAP and other environmental and social safeguards documents will form the basis for contractor activities at the project site to ensure that works proceed in accordance with established mitigation and management measures. In order to measure environmental and social impacts, it will be necessary to establish a list of indicators to be monitored, define how they will be measured on a regular basis, and identify key monitoring milestones (e.g. at mid-point of the RAP implementation process, if applicable). Appendix I presents a monitoring and evaluation checklist, which serves as a template that would need to be tailored to a specific project.

7 Identification, assessment and management of potential environmental and social risks and impacts

Note: This section outlines the principles and methods for identifying, assessing and managing potential environmental and social risks and impacts during the concept or pre-feasibility phases of energy generation and transmission projects.

The SAPP utility must identify potential significant risks and impacts prior to the ESIA, to enable the pro-active identification of project alternatives (routes, technologies, infrastructure siting etc.) at the earliest possible time. This will also assist in determining the nature and scope of specialist studies. The impact identification and assessment methodology outlined in this section, does not replace any specific national or international requirements but provides a starting point.

Risks and impacts will span the construction, operation and closure phases of a priority power project. The high-level process to be followed in identifying, assessing and managing potential risks and impacts using the ESMF tool is set out in Section 6.

7.1 Defining risks and impacts

Environmental and social risk can be defined *as a combination of the probability of certain hazard occurrences and the severity of impacts resulting from such an occurrence* (World Bank, 2016). Examples could include (i) the risk of structural failure of infrastructure due to a seismic event or (ii) insufficient water for cooling of a power plant due to severe drought.

Environmental and social impacts can be defined as *any (positive or negative) change, potential or actual, to (i) the physical, natural, or cultural environment, and (ii) impacts on surrounding community and workers, resulting from the business activity to be supported* (World Bank, 2016). Examples could include (i) loss of natural habitat due to land clearing to enable construction of a power plant, or (ii) new employment opportunities due to the development and operation of a new facility.

7.2 Methodology used for the identification of potential risks and impacts

The high-level identification of potentially significant risks and (positive and negative) impacts occur via a screening process. This should ideally be undertaken as a core component of the SAPP utility's internal project planning during the concept phase, but otherwise during pre-feasibility. The commencement of this process during feasibility will greatly reduce the potential for pro-active avoidance of potential risks and impacts.

This process should be informed by the environmental and socio-economic setting of the study area and the surrounding area of influence. A screening form presented in Appendix I will facilitate this step, as explained in Section 6. A high-level overview of the environmental and social context and baseline of each country is presented in Appendix C 1 to guide this process. It is also important to consult the various regional situation reports (listed in Appendix B) as well as baseline conditions and lessons learned on projects (Appendix C 2) to obtain a greater understanding of the project setting and the further identification of potential risks and impacts. Strategic consultations with key stakeholders during the initial stages of the project development cycle could be beneficial in identifying potential risks and impacts.

7.3 Identification of risks and impacts per projects

Direct, indirect and cumulative impacts (positive and negative) and risks need to be identified across the various disciplines of a project. The identification process should ideally be undertaken by a multi-disciplinary team, including experienced energy planning, engineering, environmental and social professionals. The team should comprise independent experts so as to provide professional, objective and impartial advice. Ideally, the team should include local experts who understand the proposed project context, including the socio-cultural setting, governance and planning issues and environmental sensitivities.

Where possible, a site visit of the project area and likely area of influence should be undertaken, to strengthen the team's understanding of the project environment. Problems experienced on other projects should be used as a starting point in identifying potential risks and impacts. Appendix C 2 provides an overview of lessons learned on energy projects in Africa.

Stakeholder engagement is an integral component in the identification of risks and impacts during the ESIA process. Engagement and consultation with project stakeholders will take place during project announcement, scoping, feedback and disclosure of study findings (Refer to Section 6.4 and Appendix H containing a generic stakeholder engagement process).

A list of typical impacts and risks associated with energy generation and transmission projects is provided as a checklist in Appendix J for reference purposes. Unique risks and impacts associated with specific project types (e.g. thermal vs. solar generation) are also listed.

The potential inter- and intra-relationships between the various project activities (e.g. pre-construction, construction, operation, decommissioning and closure) and impacts on environmental and social receptors also need be considered. All identified potential risks and impacts should be clearly linked to a receptor. The ESMF risk and impact identification process is illustrated below in Figure 7-1.

Figure 7-1: ESMF risk and impact identification process

7.4 Risk rating and classification

Where a priority power project has the potential to cause harm to people or the environment (e.g. inundation causing physical displacement of people and economic activities) or the potential exists for the environment or people to place the project at risk (e.g. lack of cooling water due to drought), such risks need to be identified (Appendix J). It is recognised that some SAPP utilities and IPPs are currently making use of rigorous risk assessment methodologies and should continue doing so during project screening and pre-feasibility.

Project funders are also likely to undertake risk categorisation and assessment of proposed projects. The World Bank's Operational Policy 4.01 – Environmental Assessment paragraph 8 (World Bank, 2007), for example, presents a project categorisation approach (Table 7-1). It classifies a proposed project into several categories, depending on the project's type, location, sensitivity and scale as well as the nature and magnitude of its potential environmental impacts.

Table 7-1: World Bank risk categories

Project category	Description
Category A	A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of other EA instruments.
Category B	A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document)
Category C	A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

(Source: World Bank, 2007)

7.5 Impact identification and rating

There are many impact rating methodologies in existence, but those that are suitably rigorous include the following key characteristics (Dalal-Clayton and Sadler, 2014; IFC, 2012):

- They are systematic;
- They are defensible;
- They are objective to the greatest extent practically possible;
- Subjective aspects, such as judgements and values, are informed by science-based criteria and standards;
- They enable comparisons to be made between impacts across different disciplines; and
- They enable all relevant parties to understand the process and rationale upon which impacts have been assessed.

An impact identification and classification process comprises the following steps:

Step 1: Define the impact

All impacts should be documented by means of a definition statement containing the following information: the activity (source of impact) and aspect thereof (e.g. site clearing for the construction plant causing habitat loss); the receptor (e.g. community, wetland and national park); whether the impact is direct, indirect or cumulative; whether the impact is potentially deemed to pose a fatal flaw. The purpose of the definition statement is to clearly explain how impacts have been interpreted so that others can see the weight attached to different factors and can understand the rationale of the assessment.

Step 2: Determine impact significance

It is necessary to make use of a standardised assessment methodology to ensure consistency between the rating of impacts in future ESIAs for SAPP projects. When determining impact significance, it is necessary to consider criteria such as magnitude (e.g. sensitivity, severity of the impact and level of stakeholder concern), spatial extent (e.g. area/population affected by the impact) and duration (e.g. short-, medium- or long-term) and probability (e.g. rare, likely or frequent). Appendix K presents a generic impact rating methodology that is consistent with methodologies used by utilities in SADC to assess power projects and aligns with GIIP.

Step 3: Classification of impact

Using the impact criteria referenced in step 2, it will be possible to determine a financial institution's likely project categorisation and associated environmental and social requirements. Table 7-1 presents the project categorisation used by the World Bank.

7.6 Mitigation and management measures of environmental and social risks and impacts

Mitigation or management measures should be specific targeted actions aimed at effectively minimising an environmental or social risk and impact to an acceptable level below a defined threshold. Management measures should be measurable and include clear roles and responsibilities, timeframes for implementation, monitoring requirements and costs. The management measures should be clearly understandable for non-subject matter experts and be practical to implement.

An adaptive approach should be adopted, whereby the efficacy of such measures is monitored. After monitoring, if it is found that the desired mitigation or management objectives are not being achieved via the current management practice, the measures should be amended to achieve greater effectiveness. Changing site or project conditions may also necessitate the review and amendment of mitigation or management measures.

A suite of management measures per energy generation and transmission type are set out in example construction and operational management plans in Appendix G for consideration during the application of the ESMF and/or the development of an ESIA and ESMP.

Note: Through the application of good practice measures, the significance of positive impacts can be optimised and often-times, additional benefits achieved. Opportunities to do so should be explored throughout the project lifecycle, but particularly during the early phases of project planning. Some of the greatest positive benefits can be achieved in the socio-economic realm, particularly for vulnerable groups such as women, children, the aged and persons with disabilities.

7.7 Direct and indirect impacts

A direct impact is an impact which is caused by the project and occurs contemporaneously in the location of the project. An indirect impact is an impact which is caused by the project and is later in time or farther removed in distance than a direct impact, but is still reasonably foreseeable, and will not include induced impacts (World Bank, 2016).

Indirect impacts must be considered if they are reasonably foreseeable. Impacts that are merely possible, or that are considered "speculative," are not reasonably foreseeable. Only those effects that are likely, or foreseeable, or reasonably foreseeable, need to be discussed. The terms "likely" and “foreseeable,” as applied to impacts, are properly interpreted as meaning that the impact is sufficiently likely to occur so that a person of ordinary good judgment would take it into account in reaching a decision. Borrowers are not expected to assess or mitigate induced impacts due to their unknown, speculative, uncertain, or remote nature).

Appendix J presents a table of potential direct and indirect impacts associated with different types of power projects.

7.8 Cumulative impacts

The cumulative impact of the project is the incremental impact of the project when added to impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the project that may occur later or at a different location. Cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time. The environmental and social assessment will consider cumulative impacts that are recognized as important on the basis of scientific concerns and/or reflect the concerns of project-affected parties. The potential cumulative impacts will be determined as early as possible, ideally as part of project scoping (World Bank 2016).

Cumulative impacts result from the incremental impacts of the project when added to other existing, planned, and reasonably predictable future projects and developments within the area of the project. Examples of cumulative impacts include effects on ambient conditions such as incremental contribution of pollutant emissions in an airshed, increase in pollutant concentrations in a water body, in soil or sediments or bioaccumulation; reduction of water flow in a watershed due to multiple withdrawals, increases in sediment loads to a watershed or increased erosion; interference with migratory routes or wildlife movement, increased pressure on the carrying capacity or the survival of indicator species in a given ecosystem, wildlife population reduction due to increased hunting, or more traffic congestion and accidents along roadways due to increases in transport activity.

Where the project involves specifically identified physical elements, aspects, and facilities that are likely to generate impacts, the risks and impacts identification process should include an assessment of the combined effects of the multiple components associated with the project (for example, quarries, roads, associated facilities). In situations where multiple subprojects occur in, or are planned for, the same geographic area, as described above, it may also be appropriate for the Borrower to conduct a Cumulative Impact Assessment (CIA) as part of the risks and impacts identification process.

Appendix K contains an overview of the CIA methodology presented in the IFC Good Practice Handbook (2013), which is listed in Appendix B for reference purposes.

8 Institutional arrangements for implementation of the ESMF

This section presents the structures that will take account of the ESMF during the development and implementation of priority power projects.

8.1 SAPP institutional arrangements

8.1.1 SAPP-ESC

The SAPP-ESC, comprised of representatives from all SAPP utilities and IPPs, aims to alert and advise the SAPP Management Committee on best environmental management practices and related issues. The ESMF will form part of an existing suite of documents prepared to guide SAPP utilities and IPPs in ensuring the environmental and social sustainability of priority power projects. SAPP's ESIA guidelines for transmission infrastructure, thermal power plants and hydro projects can be downloaded from http://www.sapp.co.zw/esc.html for reference. The SAPP-ESC will be the main vehicle for high-level coordination of ESMF implementation across the region.

8.1.2 SAPP-PAU

The SAPP-PAU aims to provide specialist advisory and technical support to SAPP utilities and IPPs to facilitate moving brownfield and greenfield priority power projects to bankability. The SAPP-PAU is presently composed of the following staff: Senior Transaction Advisor and Head of the Unit; Transaction Advisor; Financial Management Specialist; Procurement Specialist, and Environmental/Safeguards Specialist. Once of the ESMF is approved, the SAPP-PAU's dedicated Environment/Safeguard Specialist will provide advisory and technical support to member utilities and IPPs on the implementation of the ESMF.

8.2 Institutional arrangements in SAPP utilities and IPPs

The on-the-ground implementation of the ESMF will be the responsibility of the SAPP utilities and IPPs located in Angola, Botswana, DRC, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (Table 8-1). These parastatal institutions and private companies have departments, units and staff tasked with the planning, screening, scoping and assessment of proposed projects, and will be the main users of the ESMF.

Based on stakeholder consultation in 2016, it was evident that the capacity and staffing of these departments and units vary greatly. Some utilities had well-resourced and dedicated units comprising many professionals, whilst others had limited resources and capacity. This disparity can constrain the level of involvement of relevant professionals in the project development process. As recommended in this ESMF, a multidisciplinary team, which includes planners and environmental and social staff, should be involved from the concept stage. This will ensure that environmental and social considerations are taken into account during the various stages of the project life-cycle.

Given that the member utilities and IPPs are also represented on the SAPP-ESC, they will report back on the application of the ESMF. The SAPP-ESC representatives will also liaise with the relevant in-country government institutions and environmental regulators (Appendix D) to ensure that there is alignment when screening and scoping priority power projects. They will also aim to embed the ESMF within the utilities' planning structures and processes.

Table 8-1: Overview of SAPP utilities and IPPs

Country	Utility/IPP	Abbreviation	Status	Responsible ministry	Utility function
Angola	Rede Nacional De Transporte De Electricidade	RNT	NP	Ministry of Energy and Water	Generation, transmission and distribution of electricity
Botswana	Botswana Power Corporation	BPC	OP	Ministry of Minerals, Energy and Water Resources	Generation, transmission and distribution of electricity
DRC	Societe Nationale d'Electricite	SNEL	OP	Ministry of Energy and Hydraulic Resources	Generation, transmission and distribution of electricity
Lesotho	Lesotho Electricity Corporation	LEC	OP	Ministry of Natural Resources and Environmental Affairs	Generation, transmission and distribution of electricity
Malawi	Electricity Supply Corporation of Malawi	ESCOM	NP	Ministry of Natural Resources and Environmental Affairs	Generation, transmission and distribution of electricity
Mozambique	Electricidade de Mocambique	EDM	OP	Ministry of Mineral Resources and Energy	Generation, transmission, commercialisation and distribution of electricity
Mozambique	Hidro Cahora Bassa	HCB	OB	Ministry of Mineral Resources and Energy	Generation, transmission, commercialisation and distribution of electricity
Mozambique	Mozambique Transmission Company	MTC	OB	Ministry of Mineral Resources and Energy	Transmission, commercialization and distribution of electricity
Namibia	NamPower	NamPower	OP	Ministry of Mines and Energy	Generation, transmission and energy trading
South Africa	ESKOM	ESKOM	OP	Department of Energy	Generation, transmission and distribution of electricity
Swaziland	Swaziland Electricity Board	SEB	OP	Ministry of Natural Resources and Energy	Generation, transmission and distribution of electricity
Tanzania	Tanzania Electricity Supply Company Ltd	TANESCO	NP	Ministry of Energy and Minerals	Generation, transmission and distribution of electricity
Zambia	Copperbelt Energy Corporation	CEC	ITC	Ministry of Energy and Water Development	Generation and transmission of electricity
Zambia	Lunsemfwa Hydro Power Station	LHPS	IPP	Ministry of Energy and Water Development	Generation, transmission and distribution of electricity
Zambia	ZESCO Limited	ZESCO	OP	Ministry of Energy and Water Development	Generation, transmission and distribution of electricity
Zimbabwe	Zimbabwe Electricity Supply Authority	ZESA	OP	Ministry of Energy and Power Development	Provision of electricity, engineering and telecommunication services to customers

ITC: Independent Transmission Company
IPP: Independent Power Producer
OP; Operating
OB Observer
NP Non-Operating

9 Capacity building, training and technical assistance

9.1 Capacity building

The environmental and social sustainability of present and future power projects is highly dependent on the capacity of the SAPP-PAU and SAPP utilities and IPPs to coordinate the planning and screening processes. SAPP-PAU has an Environmental Safeguards Specialist and the SAPP-ESC is comprised of environmental and/or social representatives from the member utilities and IPPs. Collectively, these environmental and social experts are responsible for facilitating environmental and social management of priority power projects. Member utilities and IPPs have dedicated departments/units responsible for the oversight of planning and environmental and social assessment, management and monitoring. These functions range in size from one staff environmental/social professional to a department/unit of over a dozen professionals. Although many utilities have the adequate experience and competence to conduct their own ESIAs for certain types of project (usually Category B and C), they generally outsource ESIAs requiring international funding. Capacity building would be useful to firstly raise the awareness of planners about the safeguard requirements of international funders, and the benefits of involving environmental and social staff at the initial identification phase of the project development cycle. Secondly, it will assist environmental and social staff in being able to comprehensively screen and scope a power project.

Often national regulators responsible for reviewing ESIAs, issuing environmental authorisations and permits and monitoring and/or auditing environmental and social management, do not always have the requisite in-house capacity. Interviews held with environmental regulators indicate that there are a number of gaps between national EIA requirements and international-standard ESIAs. Staff indicate a need for capacity building and training on environmental and social safeguard processes to determine linkages between in-country EIA processes and international standard ESIAs. Other areas where capacity building is necessary include standardising methodologies for impact assessment and raising awareness about the planning, implementation and monitoring of involuntary resettlement processes.

9.2 Training and technical assistance

For the effective implementation of this ESMF, the SAPP-PAU will have to play a key role and there is a need for conducting at least two sets of training to the benefit of the following institutions:

- **SAPP utilities and IPPs**: As the proponents of priority power projects, these institutions would receive training on how to mainstream project planning processes and environmental and social safeguards within the utility and IPP. Depending on their specific needs, environmental and social staff will receive tailored training regarding the management and monitoring of energy projects;
- **National environmental agencies**: Training on how to integrate international funder safeguards pertaining to resettlement, stakeholder engagement, vulnerable groups and indigenous groups into in-country EIAs so as to avoid later time-consuming updates and additional studies; and
- **National ministries of energy**: Training on international funder safeguards notably the need to address issues including resettlement, stakeholder engagement, vulnerable groups and indigenous peoples.

Each set of training modules should be planned and implemented in a step-wise manner. To maximise efficiency and streamline logistics, each module will be implemented one after the other in each country.

In order to monitor and evaluate implementation of the ESMF, the modules will be repeated annually for three years. Depending on the requirements of member utilities and government institutions, the modules may be adapted from year to year to address other priority issues.

10 ESMF implementation budget

The ESMF implementation costs will focus on training and monitoring activities aimed at ensuring that power projects align with the ESMF recommended procedures.

Training and capacity building will take place with key stakeholders (i.e. utility and IPP staff and relevant government officials). The intention is to host in-country training workshops in all 12 countries.

A two-day training workshop will involve each SAPP utility and IPP and include environmental and social professionals, planners and environmental engineers involved in project planning and development. The aim of the training will be to mainstream the ESMF into project planning and development processes and raise awareness of the environmental and social safeguard requirements of potential financial institutions.

Training with the SAPP utility will be followed by a one-day workshop for government professionals from the respective Ministries of Energy and Environmental Agencies responsible for reviewing and authorising ESIAs. The purpose of this training will be to raise awareness about the ESMF tool and feature ways to align in-country and international ESIA requirements. Special attention will be given to standardising ESIAs for transboundary power projects as well as developing and implementing resettlement action plans. Trainers will possess the following qualifications and expertise:

- Postgraduate qualifications in integrated environmental and social management or equivalent;
- Over 15 years' project experience in the SADC, with a track record in conducting ESIAs and monitoring implementation preferably in the energy sector;
- Experience in planning and undertaking training and transferring skills based on a reputable professional approach;
- Working knowledge of national and international environmental and social requirements in SADC, including the institutional arrangements and processes of private and public-sector institutions, lenders and investors; and
- Display a pragmatic approach to environmental and social management.

Monitoring and evaluation of ESMF implementation will take place on an annual basis over a four-year period to ensure that that it is embedded within the planning and project development processes of the utilities and IPPs. The intention is to field an independent two-person team, comprising the SAPP safeguards expert and an independent consultant, to conduct monitoring and evaluation visits to six countries per year.

The total indicative cost for all implementation actions is estimated at 704,000 USD as detailed in Table 10-1.

Table 10-1: Indicative costs for ESMF implementation

	Activity	Description	Unit Cost USD	#	Total (USD)
Training					
1	Capacity building for professionals in SAPP utilities and IPPs (12 countries)	Training workshop on mainstreaming project planning/development with environmental and social safeguard requirements.	15,000 (2-day workshop per country)	12	180,000
2	Awareness raising for government professionals in Ministry of Energy and Environmental (12 countries)	Workshop on integrating environmental and social safeguards (including resettlement) into in-country EIAs.	10,000 (1-day workshop per country)	12	120,000
3	ESC workshop	Workshop to refresh ESC members on ESMF, ensure consistent and appropriate application, and expand their understanding of more complex issues.	40,000 (2-day workshop for all ESC representatives)	1	40,000[3]
ESMF Monitoring					
1	Annual monitoring and evaluation of the ESMF implementation (Year 1)	Independent evaluation of compliance with ESMF procedures by SAPP-PAU safeguard expert and an independent consultant (6 power project case studies).	7,000 (2-day visit per country)	6	42,000
2	Annual monitoring and evaluation of the ESMF implementation (Year 2)	Independent evaluation of compliance with ESMF procedures by SAPP-PAU safeguard expert and an independent consultant (6 power project case studies).	8,000 (2-day visit per country)	6	48,000
3	Annual monitoring and evaluation of the ESMF implementation (Year 3)	Independent evaluation of compliance with ESMF procedures by SAPP-PAU safeguard expert and an independent consultant (6 power project case studies).	9,000 (2-day visit per country)	6	54,000
4	Annual monitoring and evaluation of the ESMF implementation (Year 4)	Independent evaluation of compliance with ESMF procedures by SAPP-PAU safeguard expert and an independent consultant (6 power project case studies).	10,000 (2-day visit per country)	6	60,000
ESMF Update					
1	Revision of ESMF (Year 5)	Revision of ESMF to take account of new priority project and changes to lender requirements.	160,000	1	160,000

[3] This includes the flight, visa, accommodation, subsistence, local transport and conference venue hire costs for all participants and the course trainers/facilitators.

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Appendices

Appendix Table of Contents

Appendix A: ESMF Methodology

Note: This Appendix contains the methodologies for ESMF preparation phase (Appendix A1), ESMF update phase (Appendix A2) as well as the ESMF process (Appendix A3).

Appendix A 1: Methodology for ESMF Preparation Phase

Note: The ESMF methodology outlined below was originally prepared in response to the Request for Proposal, dated 11 January 2016, issued by SAPP. The ESMF methodology was formally presented in the Inception Report of 10 August 2016, which was approved by the SAPP-CC, SAPP-ESC and SAPP-PAU.

ESMF methodology for the preparation phase

1. Task 1 - Preparation of the ESMF

On 24 May 2016 at the start of the assignment, the ESMF preparation team met with the SAPP-PAU in Johannesburg to finalise contractual matters, including the scope of work and project scheduling prior to the commencement of the following sub-tasks:

Sub-Task 1.1 comprising the following actions:

- Confirm the scope of work via preparation of an inception report;
- Develop and provide guidance on environmental and social criteria to be used during the identification of priority investment projects. This will be achieved as follows:
  - Meet with SAPP-PAU in order to, amongst other issues:
    - Identify relevant sources of information and key stakeholders (including member state contacts) that need to be consulted in the process
    - Discuss the proposed scope and timing of the assignment
    - Discuss draft information gathering questionnaire
    - Agree on reporting procedure and communication protocols
  - Review relevant documentation pertaining to environmental/social performance of project planning and design, implementation and monitoring, and disclosure and feedback on large regional energy projects. A negative list of activities and potential investments not recommendable for support due to their poor environmental and social performance will then be developed
  - Provide an overview of the biophysical and socio-economic baseline conditions of anticipated project areas - this information will be verified and expanded following consultation with utilities' representatives during the in-country missions
  - Finalise and distribute (under an introduction letter from SAPP) a questionnaire to member state representatives and other identified key stakeholders and energy role-players (e.g. government ministries and departments)
  - Plan and host a day-long consultative workshop for SAPP-ESC (Workshop 1). The workshop will be held in Johannesburg, chaired by SAPP and facilitated by the SRK
  - Prepare and distribute minutes of workshop 1 to participants
  - Plan and undertake in-country missions to six-member states to meet with representatives of member states' utilities and key stakeholders as well as visit selected priority investment projects
  - The team will collect information that pertains to environmental and social issues of priority investment projects; channels for disclosure of the draft ESMF; institutional capability for project design, planning and implementation; and training and capacity building requirements. It is proposed that visits be conducted in six countries from the SAPP members, based on the specific energy focus, environmental management capacity and types of priority projects
  - Prepare a site visit report including a summary of comments and observations, programme of activities and list of stakeholders consulted.

Sub-Task 1.2 involving the definition of the current governance framework through the following actions:

- Conduct selective telephonic interviews with member state representatives;
- Review and summarise key domestic legislative, regulatory and administrative regimes and SAPP environmental guidelines within which the ESMF will be implemented;
- Focus on requirements that will apply to the planning, approval and implementation of priority investment projects; and
- Research and summarise regional and international agreements and treaties that are relevant to project planning and implementation as well as environmental management and due diligence.

Sub-Task 1.3 involving the review of institutional requirements and roles and responsibilities for adopting and implementing the ESMF through the following actions:

- Determine the authority and capability of institutions at different levels (regional and national) to manage and monitor ESMF implementation. This analysis will be based on:
  - A review of relevant documentation including situation analyses, country reports and programme reports
  - Interviews conducted during the in-country missions
  - Information received from representatives of the SAPP-ESC and member utilities
- Document for inclusion in the ESMF the implications of the institutional status quo for management procedures, training, staffing, operation and maintenance, budgeting and financial support regarding environmental and social management;
- Propose realistic and effective arrangements for SAPP to develop the capacity to screen, select, scope, disclose and consult, manage and monitor and make decisions regarding priority power projects, based on safeguard categories and instrument requirements;
- Recommend suitable roles and responsibilities, reporting lines, review and approval functions, required resources and technical assistance measures to establish and maintain SAPP and member states capacity for the technical assistance programme duration and beyond and for general due diligence management; and
- Recommend training requirements, including timelines, budget, organisational requirements and required trainer profile and expertise, for building and enhancing the capacity of SAPP member utilities and other role-players for implementing the ESMF.

Sub-Task 1.4 involving the development of a screening and assessment methodology for potential priority investment projects through the following actions:

- Prepare a set of environmental and social criteria for use in identifying and selecting priority power projects that take account of the range of environmental and social policies, standards and guidelines relating to international safeguard instruments;
- Prepare an environmental and social risk classification informed by an extensive list of relevant potential environmental and social risks and impacts that may arise from proposed priority power projects. The methodology will take account of:
  - A wide scope of social and economic impacts and outcomes for a range of groupings including women, youth and vulnerable groups
  - Safeguards categories and policies that may be triggered, which will be informed by the activities of sub-task 1.5
  - Documents required for policy compliance, due-diligence related management and decision making;
- Summarize the types of risks and impacts that may arise from priority power projects interactions with a range of environmental and social baseline conditions. This summary will include a matrix showing the probability, magnitude, duration and geographic scope of the potential risks and impacts;
- Based on the understanding of biophysical and socio-economic baseline conditions of proposed priority power projects as well as potential risk and impacts related to project

development, the team will:

- List realistic, effective and practical mitigation measures to address the spectrum of risks and impacts
- Develop generic environmental management plans for similar impact typologies
- Produce a rough estimate for the cost of mitigation measures
- Identify required studies and assessments beyond a single project scale such as regional, sectoral or cumulative studies.

Sub-Task 1.5 involving the identification and description of required instruments and procedures for assessing, managing and monitoring environmental and social risks and impacts related to priority power projects. This will include a summary of approximate nature and scale of the portfolio, project types, locations and dimensions. It will also refer to appendices and provide detailed guidance, table of contents, templates and samples for references purposes;

Sub-Task 1.6 involving the definition of the requirements for technical assistance to SAPP member states, civil society organisation, service providers and public-sector institutions to implement, manage, supervise, observe and/or support the implementation of the ESMF;

Sub-Task 1.7 involving the drafting of an ESMF that consolidates and integrates documents prepared in previous sub-tasks into a single document (Draft, version 0) that contains as a minimum the sections specified in the RFP;

Sub-Task 1.8 involving the presentation of the ESMF (draft, version 0) to the SAPP-PAU and SAPP-ESC for discussion (Workshop 2), and revision of the document based on comments. This will coincide with the presentation of the TORs (draft, version 0) prepared as part of Task 2. The workshop will also focus on building the capacity of the SAPP-ESC to implement the ESMF;

Sub-Task 1.9 involving the release of the ESMF (draft, version 1) to the SAPP role-players (i.e. member utilities, government organisations and financial institutions) together with an invitation to attend dissemination workshops to present and discuss the draft documents. This will coincide with the dissemination of the TORs (draft, version 0) prepared as part of Task 2; and

Sub-Task 1.10 involving the planning and hosting of a day-long workshop for the SAPP-ESC in Johannesburg, chaired by SAPP-CC. Proceedings will be recorded for later distribution to participants.

Key deliverables: Inception report and Draft ESMF.

2. Task 2 - Development of TORs for specific safeguard instruments

Based on information and insights gathered from Task 1 activities (Sub-Tasks 1.1 – 1.6), the team will prepare terms of reference for specific safeguard instruments that are required for identified priority investment projects. The following activities will be undertaken by the team:

Sub-Task 2.1 involving the analysis of the portfolio and priority list of projects using the environmental and social criteria and associated factor prepared for the ESMF;

Sub-Task 2.2 involving the access and review of relevant technical project documentation (e.g. maps, location plans, designs, baseline studies and drawings) for identified projects that are indexed as priority projects by SAPP;

Sub-Task 2.3 requiring rapid site visits and walkover surveys of selected priority project sites (aligned with in-country mission: refer to Sub-Task 1.1) and relevant areas of influence to:

- Verify social and environmental site conditions of at least five (5) transmission projects and five (5) generation projects from a list of some twelve (12) SAPP projects
- Anticipate potential risks and impacts, including an initial estimate of their magnitude, geographic scope and likely duration
- Prepare a write up of observations and findings for consideration;

Sub-Task 2.4 involving the determination of which international safeguard policies and standards would be triggered and which instruments for assessment and planning are required;

Sub-Task 2.5 preparing sets of terms of reference for environmental and social due diligence instruments such as ESIAs (including ESMPs), RPF, RAP and IPP for identified priority power projects. The TORs will:

- Specify the approach to investigate and analyse environmental and social conditions
- Identify anticipated risks and impacts
- Provide guidance in developing management and mitigation measures
- Provide guidance in setting out roles and responsibilities and monitoring and reporting arrangements
- Outline the required and/or recommended disclosure and consultation modalities;

Sub-Task 2.6 presenting the draft TORs (draft, version 0) to SAPP representatives for discussion and revising the document based on comments. This will coincide with the presentation of the ESMF prepared as part of Task 1; and

Sub-Task 2.7 releasing the draft TORs (draft, version 1) to the SAPP-ESC together with an invitation to attend the dissemination workshop (Workshop 2) to present and discuss the draft documents. This will coincide with the distribution of the ESMF (draft, version 1) during Task 1.

Key deliverables: Draft Terms of Reference.

3. Task 3 – Disclosure and finalisation of ESMF

After the finalisation of the draft ESMF and TORs, the team will commence a process to disclose the draft documents to a wider spectrum of stakeholders to verify the contents and facilitate finalisation. The following activities will be undertaken:

Sub-Task 3.1 revising the draft ESMF and TORs based on feedback from the dissemination workshop (workshop 2) and consultation workshop (Workshop 1) (Task 1). The ESMF and TORs (draft, version 2) will be disclosed to a broader spectrum of stakeholders in the SAPP area for review using appropriate channels (to be advised by ESC). Stakeholders will be afforded 30 consecutive days in which to review and validate findings and observations to the drafting team;

Sub-Task 3.2 presenting the ESMF and TORs (draft, version 2) will be presented and discussed in a series of seven (half-day) public hearings in various locations within the SAPP community. The hearings will involve registration, a formal presentation and a question- and-answer session;

Sub-Task 3.3 preparing a comments and response report to present the issues raised during the regional hearings. The list of participants and programme of consultation will be annexed to the final ESMF; and

Sub-Task 3.4 submitting the final ESMF and ToRs.

Key deliverables: Final ESMF and TORs.

Appendix A 2: Methodology for ESMF Update Phase

Note: The ESMF methodology outlined below was prepared in response to the Request for Proposal, dated 16 February 2018, issued by SAPP.

ESMF methodology for the update phase

1. Task 1 – Preparation of the update to the draft ESMF

At the start of the assignment the SRK team met with the SAPP ESMF task team in Johannesburg on 26 March 2018 to finalise contractual matters, including the scope of work and scheduling prior to the commencement of the following sub-tasks:

Sub-Task 1.1 – The team meets with SAPP PAU to discuss the following items:

- Finalize the contract matters
- Identify and agree on additional stakeholders that need to be consulted telephonically
- Discuss the proposed scope and timing of the assignment
- Discuss the interview schedule
- Agree on reporting procedure and communication protocols
- Prepare notes from the inception meeting for submission to SAPP representatives.

Sub-Task 1.2 –Based on the original terms of reference and World Bank comments, the team will commence a process to review and revise the ESMF (dated 30 November 2016) drawing on inputs from relevant team members.

Key deliverables: Inception meeting notes and list of stakeholders to be interviewed

2. Task 2 – Additional stakeholder consultation

Based on information and insights gathered from Task 1, the team will consult several stakeholders representing a broader spectrum of society, notably CSOs, research institutions and financial organizations. The following activities will be undertaken by the team:

Sub-Task 2.1 - Contact the identified stakeholders to set up a time for a teleconference and/or Skype call to present the ESMF process and obtain their inputs

Sub-Task 2.2 – Using standardized schedule of questions, conduct interviews with additional stakeholders

Sub-Task 2.3 – Record the comments made by stakeholders and include these in the relevant section of the ESMF and submit the revised document to SAPP and the World Bank (Task Team) for review

Key deliverables: Updated ESMF

3. Task 3 – Update and finalise the ESMF

This task will involve the finalization of the ESMF. The activities are as follows:

Sub-Task 3.1 – Update the ESMF by incorporating the comments made by SAPP and the World Bank

Sub-Task 3.2 – Submit the updated ESMF to SAPP and the World Bank (Regional Safeguard Advisor) for final review and approval,

Sub-Task 3.3 - Following sign off from SAPP and the World Bank, undertake a plain language edit of the main report of the ESMF.

Key deliverables: Final ESMF

4. Task 4 – Organize a workshop

Once the ESMF has been updated and finalised, the team will undertake the following activities:

Sub-Task 4.1 - The team will plan and host a day-long disclosure workshop for participants, including

16 SAPP member state representatives and one member from the Projects Advisory Unit (PAU). The workshop will be held in Johannesburg, chaired by a SAPP and facilitated by the SRK

Sub-Task 4.2 – Proceedings will be recorded for later distribution to participants.

Key deliverables: Workshop proceedings

5. Task 5 – Prepare French and Portuguese translations of the ESMF

Following the workshop with SAPP members, the team will undertake the following activities:

Sub-Task 5.1 – Commence translation of the ESMF into French and Portuguese. The following annexes will as a minimum also be translated:

- List of persons and organizations involved in the preparation of the ESMF
- References: documents, whether published or not, that were used to prepare the studies and outputs; list of related reports
- Minutes or summary of meetings among the relevant institutions and of consultations, including those undertaken to obtain the view of key stakeholders including government agencies, utilities, research institutes and relevant CSO groups
- Tables, figures or detailed descriptions of data that appear in summary form in the body of the text
- Table of contents, terms of reference, templates, samples of guidance on Environmental Social Impact Assessment (ESIA) Social Impact Assessment (SIA), Environmental Management Plan (EMP), Request for Proposal (RFP) etc.

Sub-Task 5.2 – The French and Portuguese translations will be reviewed by technical experts to ensure that they are aligned to the English version of the ESMF

Sub-Task 5.3 – Once the French and Portuguese translations have been updated to reflect comments from the technical reviewers, the documents will be submitted to SAPP.

Key deliverables: Final English ESMF, Final French ESMF, Final Portuguese ESMF

Appendix A 3: ESMF Process

ESMF preparation and update approach

The ESMF was prepared in a phased and iterative manner as follows:

- Task 1 covering the preparation of an inception report and initial consultation in a workshop with the SAPP Environmental Sub-Committee (SAPP-ESC);
- Task 2 involved the development of ESMF and terms of reference following consultations with SAPP stakeholders, including member utilities, relevant government institutions and international financial institutions;
- Task 3 involved the disclosure of the draft ESMF to SAPP stakeholders and its finalisation;
- Task 4: involved ESMF review and engagement with additional stakeholders, including civil society organisations (CSOs), utilities, research institutions and advocacy groups;
- Task 5: involved the update and finalisation of the ESMF; and
- Task 6: involved the translation and technical review of the final ESMF into Portuguese and French.

Figure A3-1 below, presents a schematic of the phases, tasks and deliverables of the ESMF preparation and update processes.

SAPP ESMF Appendix A3 – ESMF Process

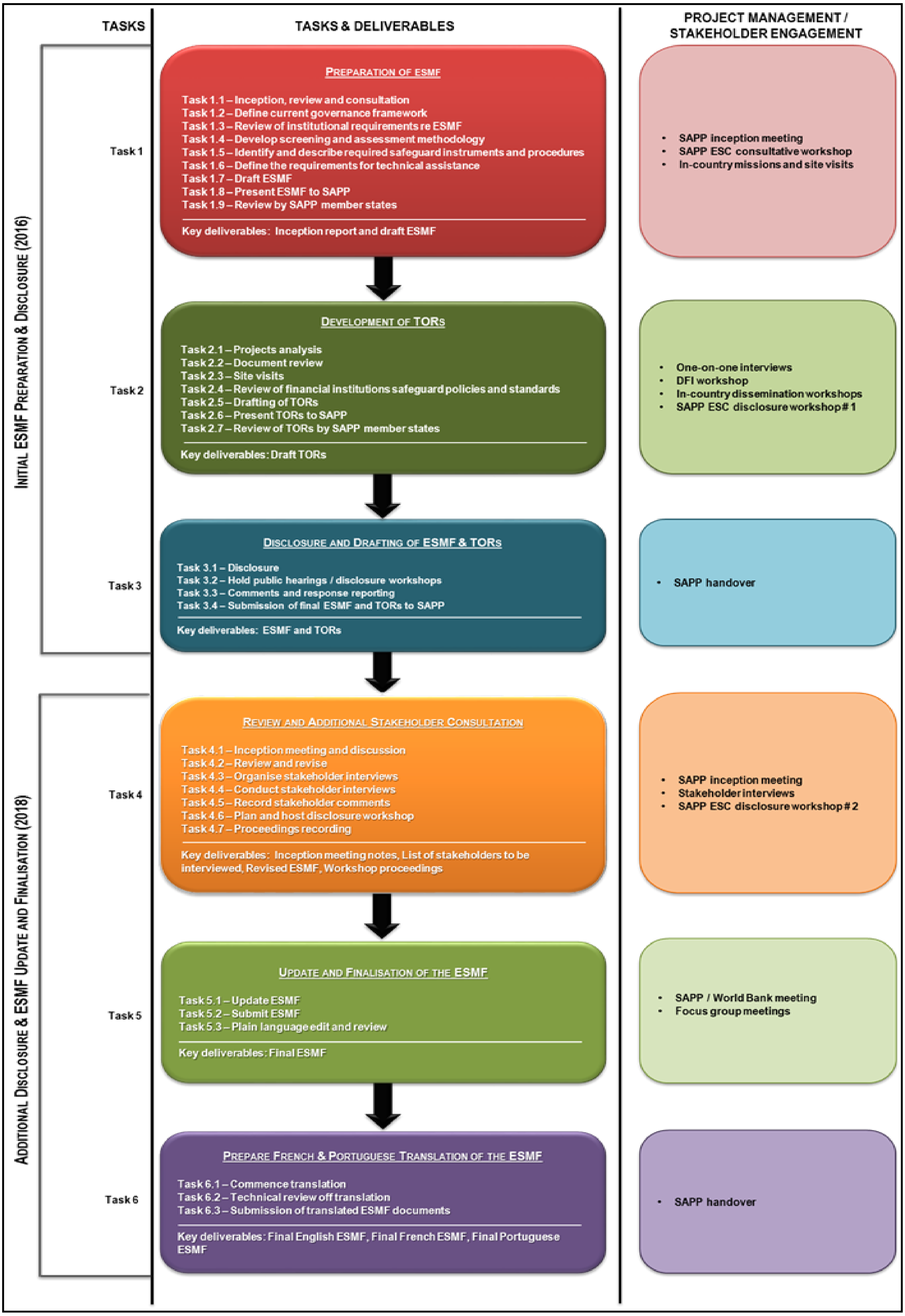


Figure A3-1: ESMF preparation and update phases

Appendix B: List of Reference Documents

List of Contents

Annexure 1: Good Practice Handbooks

- *IFC, Cumulative Impact Assessment Handbook*
  https://www.ifc.org/wps/wcm/connect/3aebf50041c11f8383ba8700caa2aa08/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES
- *IFC, Stakeholder Engagement Handbook*
  https://www.ifc.org/wps/wcm/connect/938f1a0048855805beacfe6a6515bb18/IFC_StakeholderEngagement.pdf?MOD=AJPERES
- *IFC, Handbook for preparing Resettlement Action Plans*
  https://commdev.org/userfiles/ResettlementHandbook.pdf

Annexure 2: Legislation Reference Documents

- *SADC Protocol on Energy*
  https://extranet.sadc.int/files/6913/2680/2180/20060623_protocol_energy.pdf
- *SADC EIA Handbook*
  https://www.dbsa.org/EN/About-Us/Publications/Documents/SADC%20Handbook.pdf
- *EIA Legislation:*
  - *South Africa*
    https://www.environment.gov.za/sites/default/files/legislations/nema_eia2014regulations_g38282.pdf
  - *Lesotho*
    http://www.osall.org.za/docs/2011/03/Lesotho-Environment-Act-10-of-2008.pdf
  - *Swaziland*
    http://extwprlegs1.fao.org/docs/pdf/swa42647.pdf
  - *Botswana*
    http://www1.eis.gov.bw/EIS/Policies/Environmental%20Policies/Environmental%20Assessment%20Act.pdf
  - *Namibia*
    http://www.lac.org.na/laws/2012/4878.pdf
  - *Zimbabwe*
    https://www.cbd.int/doc/measures/abs/msr-abs-zw-en.pdf
  - *Mozambique*
    https://www.dbsa.org/EN/About-Us/Publications/Documents/SADC%20Handbook.pdf
  - *Malawi*
    http://extwprlegs1.fao.org/docs/pdf/mlw13233.pdf
  - *Zambia*
    http://www.azmec.co.zm/downloads/acts/SI%2028%20EPPCA%20ACT%201997%20EIA%20Regulations.pdf
  - *Angola*

http://saiea.com/dbsa_handbook_update09/pdf/3Angola09.pdf

- *United Republic of Tanzania*

  http://www.tzdpg.or.tz/fileadmin/_migrated/content_uploads/Environmental_Management_Act_04.pdf

- *Democratic Republic of Congo*

  https://www.dbsa.org/EN/About-Us/Publications/Documents/SADC%20Handbook.pdf

Annexure 3: SAPP Environmental Guidelines

- *Environmental and Social Impact Assessment Guidelines for Transmission infrastructure for the SAPP Region*

  https://www.researchgate.net/profile/Francois_Nshimiyimana2/post/Does_anyone_know_of_Environmental_Impact_Assessment_EIA_documents_on_transmission_lines_and_telecommunication_lines/attachment/59d6479ac49f478072eaf1be/AS%3A273845158645763%401442301182026/download/Transmission+Line+Guidelines.pdf

- *SAPP Guidelines on the Use and Disposal of CFL Lamps*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *SAPP Occupational Health & Safety Environmental Guideline*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *Guidelines for Environmental Impact Assessment (EIA) for Thermal Power Plants*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *SAPP Position on Climatic Change*

  http://www.sapp.co.zw/sites/default/files/SAPP%20POSITION%20ON%20CLIMATE%20CHANGE%20update%20August%202004.pdf

- *SAPP PCB Guidelines Jan 2008*

  http://www.sapp.co.zw/sites/default/files/SAPP%20PCB%20Guidelines%20draft%20Final.doc%20Jan%202008.pdf

- *SAPP Guidelines on the Management of Oil Spills*

  http://www.h4sd.info/getattachment/Documents-and-links/Session-3_Matseliso-Moremoholo.pdf.aspx

- *Guidelines for the safe Control, Processing, Storing, Removing and Handling of Asbestos and Asbestos Containing Materials and Articles for SAPP*

  http://envfor.nic.in/sites/default/files/asbestos%20based%20industries_10-may_1.pdf

- *Guidelines for the Management and Control of Electricity Utility Infrastructure with regard to Animal Interaction for SAPP.*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *Guidelines for Environmental and Social Impact Assessments for Hydro Projects in SAPP Region Part 1*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *Guidelines for Environmental and Social Impact Assessments for Hydro Projects in SAPP Region Part 2*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

- *Guidelines for Environmental and Social Impact Assessments for Hydro Projects in SAPP Region Appendix 1*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines
- *Guidelines for Environmental and Social Impact Assessments for Hydro Projects in SAPP Region Appendix 2*

  http://www.sapp.co.zw/sapp-environmental-management-guidelines

Annexure 4: International Policies, Safeguards and Guidelines

- *Equator Principles*

  http://equator-principles.com/wp-content/uploads/2017/03/equator_principles_III.pdf
- *African Development Bank*

  https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/December_2013_-_AfDB%E2%80%99S_Integrated_Safeguards_System__-_Policy_Statement_and_Operational_Safeguards.pdf
- *European Investment Bank*

  http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf
- *International Finance Cooperation*

  https://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afdf998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES
- *World Bank*

  http://documents.worldbank.org/curated/en/383011492423734099/pdf/114278-WP-REVISED-PUBLIC-Environmental-and-Social-Framework.pdf
- *China Development Bank*

  https://www.unglobalcompact.org/system/attachments/cop_2016/335091/original/CHINA_DEVELOPMENT_BANK_SUSTAINABILITY_REPORT_2015.pdf?1478253427
- *Japanese International Cooperation Agency*

  https://www.jica.go.jp/english/our_work/social_environmental/guideline/pdf/guideline100326.pdf
- *Development Bank of Southern Africa*

  https://www.dbsa.org/EN/About-Us/Publications/Documents/DBSA%20Environmental%20and%20Social%20Safeguard%20Standards%202018.pdf
- *Swedish International Development Agency*

  https://www.sida.se/contentassets/d98acab07fba4d3ea6608530ac757ac5/sidas-environmental-management-system_1297.pdf
- *KfW Development Bank*

  https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente-Richtlinien/Nachhaltigkeitsrichtlinie_EN.pdf

Annexure 5: Strategic Environmental Assessment Guidelines

- *Organisation for Economic Core Operation and Development: Applying Strategic Environmental Assessment*

  http://content-ext.undp.org/aplaws_publications/1769217/SEA%20and%20Adaptation%20to%20CC%20full%20version.pdf
- *World Bank: Strategic Environmental Assessment for Policies*

  http://siteresources.worldbank.org/INTRANETENVIRONMENT/1705772-1210788188539/21819527/SEA_FOR_POLICIES.pdf

Annexure 6: Status Reports

- *Africa Energy Monitor 2016*

  https://www.sadc.int/files/1514/7496/8401/SADC_Energy_Monitor_2016.pdf
- *Africa Energy Outlook – IEA*

  https://www.iea.org/publications/freepublications/publication/WEO2014_AfricaEnergyOutlook.pdf
- *Southern African Environment Outlook*

  https://www.environment.gov.za/sites/default/files/reports/environmentoutlook_executivesummary.pdf
- *Ecosystem Services in Southern Africa: A Regional Assessment*

  https://www.millenniumassessment.org/documents_sga/SAfMA_Regional_Report_-_final.pdf
- *Millennium Report*

  https://www.researchgate.net/publication/40119375/download
- *Southern Africa: An Overview of the Environment*

  http://saiea.com/SAIEA-Book/Southern%20Afr1.pdf
- *Zambezi River Basin Atlas of the Changing Environment*

  https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/145/original/ZambeziAtlas_screen.pdf?1483646695

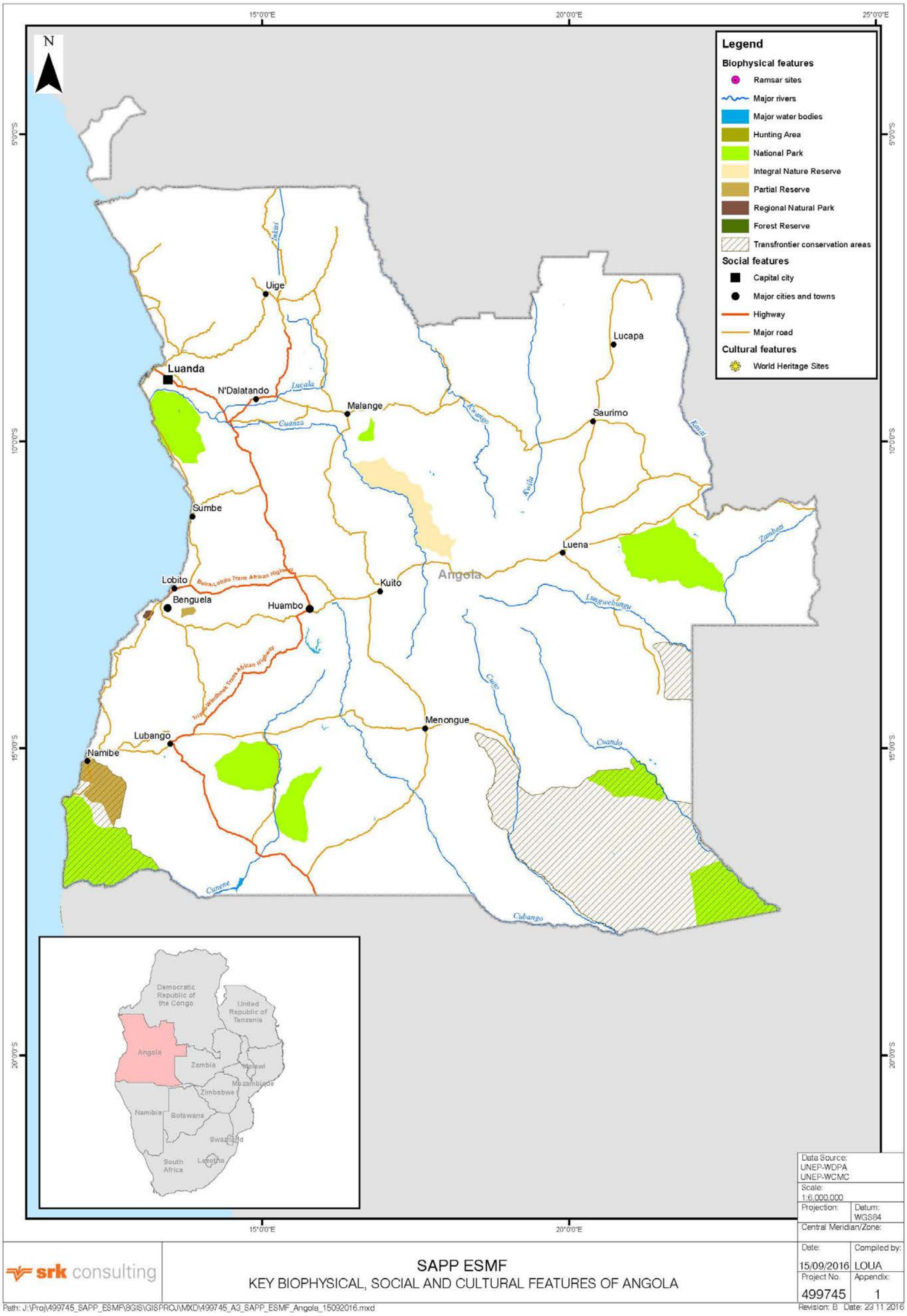
Appendix C: National Baseline Conditions and Lessons Learned on Projects

Note: This Appendix contains the national baseline conditions in tabular and spatial format for all SADC mainland countries (Appendix C1) as well as the lessons learned from energy projects in Africa (Appendix C2) which includes projects visited in 2016.

Appendix C 1: Overview of National Baseline Conditions

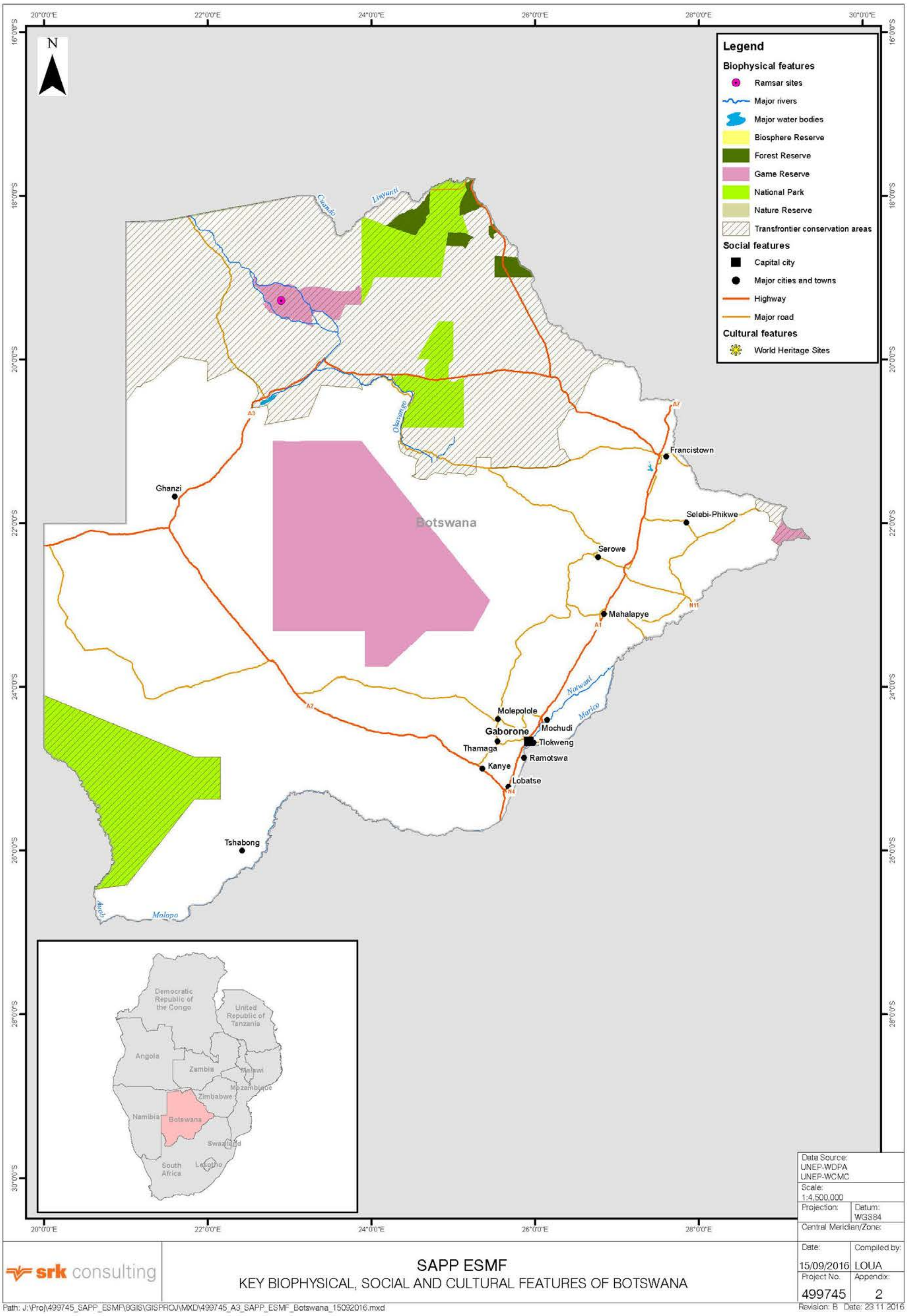
<u>*Note:</u> The information contained in this table is generic and provides an overview of biophysical and socio-cultural features, resources and potential sensitivities that occur in the SADC mainland. Maps depicting national baseline features are provided for each of the SAPP member countries after each table. Additional information on national baseline conditions can be sought in reference documents presented in Appendix B. The information in these tables should be supplemented by the insights presented in the lessons learned table in Appendix C2.

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Angola	Like the rest of tropical Africa, Angola experiences distinct, alternating rainy and dry seasons. The coastal strip is tempered by the cool Benguela current, resulting in a climate similar to coastal Peru or Baja California. It is semiarid in the South and along the coast to Luanda.	Topographically, Angola consists mainly of broad tablelands above 1,000 m (3,300 ft) in altitude; a high plateau (planalto) in the center and south ranges up to 2,400 m (7,900 ft). The highest point in Angola is Mt. Moco, at 2,620 m (8,596 ft), in the Huambo region; other major peaks are Mt. Mejo (2,583 m/8,474 ft), in the Benguela region, and Mt. Vavéle (2,479 m/8,133 ft), in Cuanza Sul. *http://www.nationsencyclopedia.com/Africa/Angola-TOPOGRAPHY.html#ixzz4EwKQc7l*	Rivers are numerous, but few are navigable. There are three types of rivers in Angola: constantly fed rivers (such as the Zaire River), seasonally fed rivers, and temporary rivers and streams. Only the Cuanza, in central Angola, and the Zaire, in the north, are navigable by boats of significant size. *http://www.nationsencyclopedia.com/Africa/Angola-TOPOGRAPHY.html#ixzz4EwKTquP*	Land use • Agricultural land 47.3%; • Arable land 3.8%; • Permanent crops 0.2%; • Permanent pasture 43.3%; • Forest 46.8%; and • Other 5.9%. (2011 est.)	Angola's biological diversity is one of the richest in Africa. The escarpment zone of Angola is particularly rich in endemic species. The climatic diversity, combined with the ecological variability and that of soils, contribute to the formation of bioclimatic zones that entail from dense tropical forests to the absence of vegetation in the desert. Loss and degradation of habitats are some of the major problems facing the Angolan biodiversity. Although there is no accurate data as to the extent of the phenomenon, experts agree that this problem tends to worsen for several reasons, amongst which human pressure is regarded as the main cause. According to IUCN (2002), about 75% of animals and plants are listed in the Red List as being vulnerable, endangered, critically endangered or of which there are no available data. The Guinea-Congolese biome covers 10.7% of the national territory and is constantly losing its habitat. Loss of habitat in Mayombe forest is also due to the fragmentation of the forest as a result of road construction and urbanization of the area. *(Convention on Biological Diversity, 2016)*	7% of Angola is protected area. Of that: • 0% is Land Area Protected; and • 0% Marine Area Protected. There are 12 protected areas in Angola *(InforMEA, 2016)*	• Population 19,625,353 • Life expectancy at birth: o Male 54.49 years; and o Female 56.84 years (2015 est.). • Literacy: Percentage of age 15 and over that can read and write: Male 82%; and Female 60.7% (2015 est.). • Angola's economy is overwhelmingly driven by its oil sector. Oil production and its supporting activities contribute about 50% of GDP, more than 70% of government revenue, and more than 90% of the country's exports. Diamonds contribute an additional 5% to exports; • Increased oil production supported growth averaging more than 17% per year from 2004 to 2008. A postwar reconstruction boom and resettlement of displaced persons has led to high rates of growth in construction and agriculture as well; • The global recession that started in 2008 stalled economic growth. In particular, lower prices for oil and diamonds during the global recession slowed GDP growth to 2.4% in 2009; • Angola formally abandoned its currency peg in 2009, and in November 2009 signed onto an IMF; • Consumer inflation declined from 325% in 2000 to less than 9% in 2014; and • Corruption, especially in the extractive sectors, is a major long-term challenge. *(Angola, CIA, 2016)*	• Biomass accounts for 58% of the country's energy consumption, oil 35%, gas 4% and hydroelectric 3%; • Primary energy use in 2009 in Angola was 138 TWh and 7 TWh per million persons; • Angola has extensive hydroelectric power resources that far exceed its present needs; • The Capanda Dam, on the Cuanza River, provides Luanda's industries with cheap power. Two dams on the Catumbela River produce power for the Lobito and Benguela areas (Lomaum Dam). Matala Dam 180 km of Lubango provides power to Lubango and Namibe. As of late 2002, only three of the country's six dams (Cambambe, Biopo, and Matala) were operational; • In 2002, electricity generation was 1.728 TWh, of which 34.5% came from fossil fuels and 65.5% from hydropower. • Electricity is produced by Empresa Nacional de Electricidade de Angola; and • Crude oil, is the leading source of government revenue, accounting for \$2.9 billion in exports in 1994. *(IEA Key energy statistics 2011 Page: Country specific indicator numbers from page 48)*



Legend
Biophysical features
Ramsar sites
Major rivers
Major water bodies
Hunting Area
National Park
Integral Nature Reserve
Partial Reserve
Regional Natural Park
Forest Reserve
Transfrontier conservation areas
Social features
Capital city
Major cities and towns
Highway
Major road
Cultural features
World Heritage Sites
Luanda
Uige
N'Dalatando
Malange
Lucapa
Saurimo
Sumbe
Lobito
Benguela
Huambo
Kuito
Luena
Angola
Lubango
Namibe
Menongue
Democratic Republic of the Congo
United Republic of Tanzania
Angola
Zambia
Malawi
Mozambique
Zimbabwe
Namibia
Botswana
Swaziland
South Africa
Lesotho
Data Source: UNEP-WDPA UNEP-WCMC
Scale: 1:6,000,000
Projection:
Datum: WGS84
Central Meridian/Zone:
Date: 15/09/2016
Compiled by: LOUA
Project No. 499745
Appendix: 1
srk consulting
SAPP ESMF
KEY BIOPHYSICAL, SOCIAL AND CULTURAL FEATURES OF ANGOLA
Path: J:\Proj\499745_SAPP_ESMF\8GIS\GISPROJ\MXD\499745_A3_SAPP_ESMF_Angola_15092016.mxd
Revision: B Date: 23 11 2016

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Botswana	Botswana's climate is semi-arid. Though it is hot and dry for much of the year, there is a rainy season which runs through the summer months. Rainfall tends to be erratic, unpredictable and highly regional. *(Botswana Tourism Organisation, 2013)*	The country is a broad tableland with a mean altitude of 1,000 m (3,300 ft). A vast plateau about 1,200 m (4,000 ft) in height, extending from near Kanye north to the Zimbabwean border, divides the country into two distinct topographical regions. The eastern region is hilly bush country and grassland (veld). To the west lie the Okavango Swamps and the Kalahari Desert. *(http://www.nationsencyclopedia.com/Africa/Botswana-TOPOGRAPHY).*	The only sources of year-round surface water are the: • Chobe River in the north; • Limpopo River in the southeast; and • Okavango in the northwest. In seasons of heavy rainfall, floodwaters flow into: • The Makgadikgadi Salt Pans; • Lake Ngami; and • Lake Xau. *(http://www.nationsencyclopedia.com/Africa/Botswana-TOPOGRAPHY)*	Land use: • Arable land 0.45%; • Permanent crops 0%; and • Other 99.55%. *(Focus on Land in Africa, 2016)*	Endemism of plants and animals is very low, largely because the vegetation and soil types within Botswana extend over the borders into adjoining countries. Also, there are not high mountain ranges where endemic biotas have evolved. There are: • 150 species of mammal; • 570 species of birds; and • 2150-3000 species of plants. The Okavango Delta and Chobe Reserves also have vegetation that attracts a few tropical species from further north, not represented anywhere else in southern Africa *(National Biodiversity Strategy and Action Plan, 2008)*	20% of Botswana is protected area. Of that: • 29% is Land Area Protected; and • 0% Marine Area Protected. There are 18 protected areas in Botswana. *(InforMEA, 2016)*	• Population 2.021 million (2013); • Life expectancy at birth: o Male: 61.12 years; and o Female: 60.75 years. • Literacy: Percentage age 15 and over that can read and write: o Male 80.4%; and o Female 81.8% *(Census, Demographic Indicators, Botswana, 2001);* • Major Infectious diseases: o Food or waterborne diseases: ▪ Bacterial diarrhea; ▪ Hepatitis A; and ▪ Typhoid fever. o Vector-borne disease: ▪ Malaria *(CIA, Botswana, 2013).* Botswana has been one of the fastest growing economies in the world and has moved into the ranks of upper-middle income countries. Real GDP showed robust growth of average 5% per annum over the past decade. Economic growth strongly bounced back in 2013 (+9.9%) as driven by the diamond sector but decelerated again in 2014 (+3.2%) to eventually turn negative in 2015 (-0.3%). *(World Bank Overview of Botswana, 2016)*	• Botswana has significant reserves of coal, estimated at over 200 billion tons. No petroleum reserves have been identified and all petroleum products are imported refined, mostly from South Africa; • There is extensive woody biomass from 3 to 10t / hectare; • Most electric power is generated thermally in installations run by the Botswana Power Corporation, a public enterprise established in 1970; • Electric generating capacity consists of the: o 132 MW Morupole coal-fired plant. • The 60 MW coal-fired plant at Selebi-Phikwe has been closed; • Total capacity in 2002 stood at 132 MW and production of electricity in that same year totaled 930 GWh; • Fossil fuels were used exclusively; • Consumption of electricity totaled 1.989 TWh; • Coal production in 2002 consisted entirely of the bituminous type and totaled 992,000 tons; • Coal is mined solely at Morupule Colliery by Debswana, mostly for the generation of electricity; and • The government is considering constructing a coal-fired power plant at the same coal field, which would be designed to export power to South Africa. *(National Energy Policy for Botswana, 2012).*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Biophysical features
Ramsar sites
Major rivers
Major water bodies
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Forest Reserve
Game Reserve
National Park
Nature Reserve
Transfrontier conservation areas
Social features
Capital city
Major cities and towns
Highway
Major road
Cultural features
World Heritage Sites
Botswana
Francistown
Ghanzi
Selebi-Phikwe
Serowe
Mahalapye
Molepolole
Mochudi
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KEY BIOPHYSICAL, SOCIAL AND CULTURAL FEATURES OF BOTSWANA
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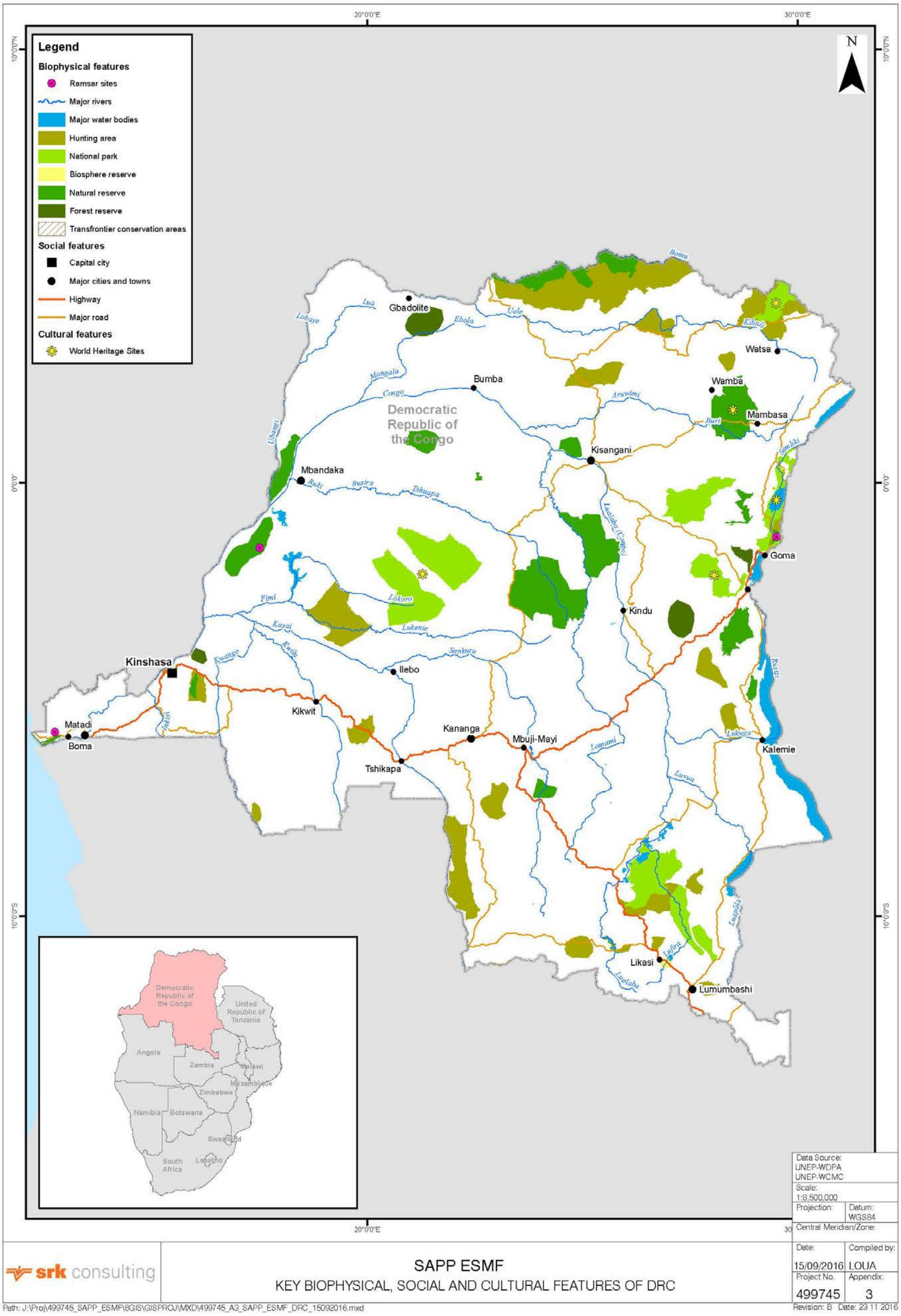
Revision: B Date: 23 11 2016

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	• Social	• Energy
Democratic Republic of Congo	The climate is hot and humid in the river basin and cool and dry in the southern highlands, with a cold, alpine climate in the Rwenzori Mountains. *(Climate Zone, 2016)*	Central plateau covered by tropical rainforest, surrounded by mountains in the west, plains and savanna in the south/southwest, and grasslands in the north. The high mountains of the Ruwenzori Range on the eastern borders *(Topographic map.com)*	The Congo Basin is the sedimentary basin of the Congo River, located in west equatorial Africa. The basin begins in the highlands of the East African Rift system with input from the Chambeshi River, the Uele and Ubangi Rivers in the upper reaches and the Lualaba River draining wetlands in the middle reaches. The basin is a total of 3.7 million square kilometers (Mineral deposits & Earth evolution. Geological Society, 2005	Land use: Arable land 1,6%; Permanent crops 0.2%; Forest 65.5%; and Other lands 32.7%. *(DRC, Resource Stats, 2015)*	DRC has the highest number of species for almost all groups of organisms with the exception of plants, in which it is second to South Africa. DRC has number of spectacular endemic species like the okapi, Grauer's gorilla, bonobo, and the Congo peacock. It possesses over 50% of Africa's tropical forests. Dense forests and woodlands cover half of the DRC's total surface area of 2.3 million km² and play a critically important role in maintaining global climatic cycles. It is extremely rich in natural resources. DRC contains 80% of the world's reserves of columbite-tantalite (coltan) and 10% of the world's copper. It is the world's largest producers of industrial diamonds *(Fauna and Flora International, 2016)*	38% of DRC is protected area. Of that: • 35% is Land Area Protected; and • 3% Marine Area Protected. There are 9 protected areas in the DRC. *(InforMEA, 2016)*	• Population 71,246,000 (2015 est.) • Life expectancy at birth: o Male: 54.7 years o Female: 57.7 years (2013) • Literacy: Percentage of population age 15 and over: o Male 76.9%. o Female 57% (2010) • Despite an impressive economic growth rate and a reduction in the poverty rate from 71% in 2005 to 63% in 2012, the poverty rate remains high in the DRC. *(WB, 2016)* • Major Infectious diseases: o Food or waterborne diseases: ▪ Bacterial and protozoal diarrhea; ▪ Hepatitis A; and ▪ Typhoid fever. o Vector-borne diseases: ▪ Malaria; ▪ Dengue fever; and ▪ Trypanosomiasis-gambiense (African sleeping sickness). o Water contact disease: ▪ Schistosomiasis. o Animal contact disease: ▪ Rabies. *(CIA DRC, 2013)*	• DRC has reserves of petroleum, natural gas, coal, and a potential hydroelectric power generating capacity of around 100,000 MW. If harvested to its full potential, hydroelectricity could provide power for the whole of Africa; • The Inga Dam, alone, has the potential capacity to generate 40,000 to 45,000 MW of electric power, sufficient for the electrical needs of the entire Southern Africa region. In 2001, the dam was estimated to have an installed generating capacity of 2,473 MW and there are plans to raise the Inga power station to 44,000 MW capacity; • In 2007, the DRC had a gross production of public and self-produced electricity of 8,302 million kWh. The DRC imported 78 million kWh of electricity in 2007; • The DRC is also an exporter of electric power. In 2003, electric power exports came to 1.3 TWh, with power transmitted to the Republic of Congo (Brazzaville), as well as to Zambia and South Africa; • There are plans to build the Western Power Corridor (Westcor) to supply electricity from Inga III hydroelectric power plant to the DRC, Angola, Namibia, Botswana and South Africa *(IEA Key Energy Status, 2010);* • The national power company is Société nationale d'électricité (SNEL); • As of 2003, 98.2% of electricity was produced by hydroelectric power; and • Only 6% of the country has access to electricity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Major rivers
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Hunting area
National park
Biosphere reserve
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Transfrontier conservation areas
Social features
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Major cities and towns
Highway
Major road
Cultural features
World Heritage Sites
Democratic Republic of the Congo
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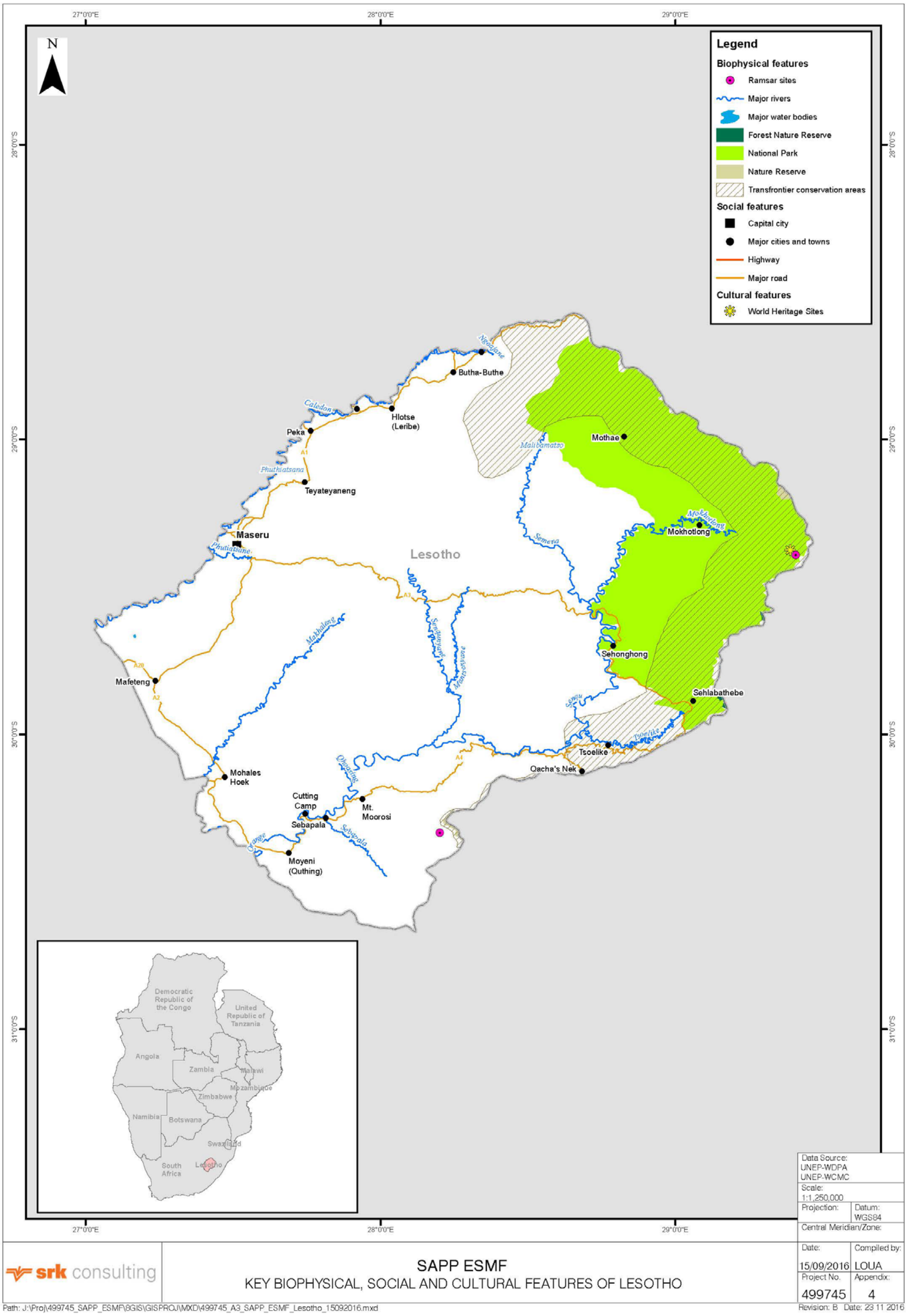
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	• Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Lesotho	Lesotho has a continental climate, with hot summers and cold winters. Maseru and its surrounding lowlands often reach 30 °C (86 °F) in the summer. *Lesotho travel guide". The Africa Guide. Retrieved 2008-04-19.*	Three distinct geographical regions, demarcated by ascending altitude, extend approximately north-south across Lesotho. The western quarter of the country is a plateau averaging 1,500 to 1,850 m (4,900–6,100 ft). The soil of this zone is derived from sandstone and, particularly in the westernmost region, is poor and badly eroded. The remainder of the country is highland. A zone of rolling foothills, ranging from 1,800 to 2,200 m (5,900– 7,200 ft), forms the border between the lowlands and the mountains in the east. The Drakensberg Range forms the entire eastern and southeastern border. A spur of this range, the Maluti Mountains, runs north and south. Where it joins the Drakensberg Range there is a high plateau between 2,700 and 3,200 m (8,900–10,500 ft) in elevation. The highest point is Thabana Ntlenyana, 3,482 m (11,425 ft), in the east. *http://www.nationsencyclopedia.com/Africa/Lesotho-TOPOGRAPHY.html#ixzz4EwJ8zjrZ*	The sources of two of the principal rivers of South Africa, the Orange and the Tugela, are in these mountains. Tributaries of the Caledon River, which forms the country's western border, also rise here. The Orange and Caledon rivers, together with their tributaries, drain more than 90% of the country. *http://www.nationsencyclopedia.com/Africa/Lesotho-TOPOGRAPHY.html#ixzz4EwJCRn00*	Land use: • Agricultural land: 76.1%; • Arable land 10.1%; • Permanent crops 0.1%; • Permanent pasture 65.9%; • Forest 1.5%; and • Other 22.4%. (2011 est.)	Lesotho has a remarkably rich variety of plants and animals, which are very valuable to the present and future generations. There is a significant number of endemics namely: • 2961 plant species; • 63 species of mammals; • 315 species of birds; • 40 species of reptiles; • 19 species of amphibians; • 14 species of fresh water fish; and • 1279 species of invertebrates.	1% of Lesotho is protected area. Of that: • 1% is Land Area Protected; and • 0% Marine Area Protected. There are 2 protected areas in Lesotho. *(InforMEA, 2016)*	• Population 2,067,000; • Life expectancy at birth: o Male 52.76 years; and o Female 52.97 years (2015 est.). • Literacy: Percentage age 15 and over can read and write: o Male 70.1%; and o Female: 88.3% (2015 est.). • Unemployment stood at 24% in 2008 and is unlikely to have changed much; • Lesotho relies on South Africa for much of its economic activity, and imports 90% of the goods it consumes from South Africa, including most agricultural inputs. Households depend on remittances from family members working in South Africa, in mines, on farms, and as domestic workers. As a member of the Southern Africa Customs Union (SACU), revenues from SACU accounted for roughly 44% of total government revenue in 2014. Royalties for water transferred to South Africa from a dam and reservoir system in Lesotho also add to the revenue stream; • Government consumption accounted for 37% of GDP in 2014 and remains Lesotho's largest employer. Lesotho's largest private employer is the textile and garment industry which produces garments for export to South Africa and the US; and • Diamond mining in Lesotho has grown in recent years. *(Lesotho, CIA, 2013)*	• Most of the electricity produced is based on hydro sources, however the country requires energy imports from neighbouring countries to meet its demand; • There is very low access to electricity, with only 6% of rural households connected to the national grid; • Lesotho imports almost as much (66MW) as it produces domestically (72MW); • Solar PV is seen as having a very high potential especially in rural electrification for off-grid installations in households, schools, hospitals etc.; • Due to very mountainous terrain and sparse population, grid extension is not viable in the southern parts of the country; and • Solar energy is also seen as a means for water heating and the government has embarked on a project to equip public buildings with solar heaters. *(EEP, 2015).*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Capital city
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Highway
Major road
Cultural features
World Heritage Sites
Lesotho
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Date: 15/09/2016
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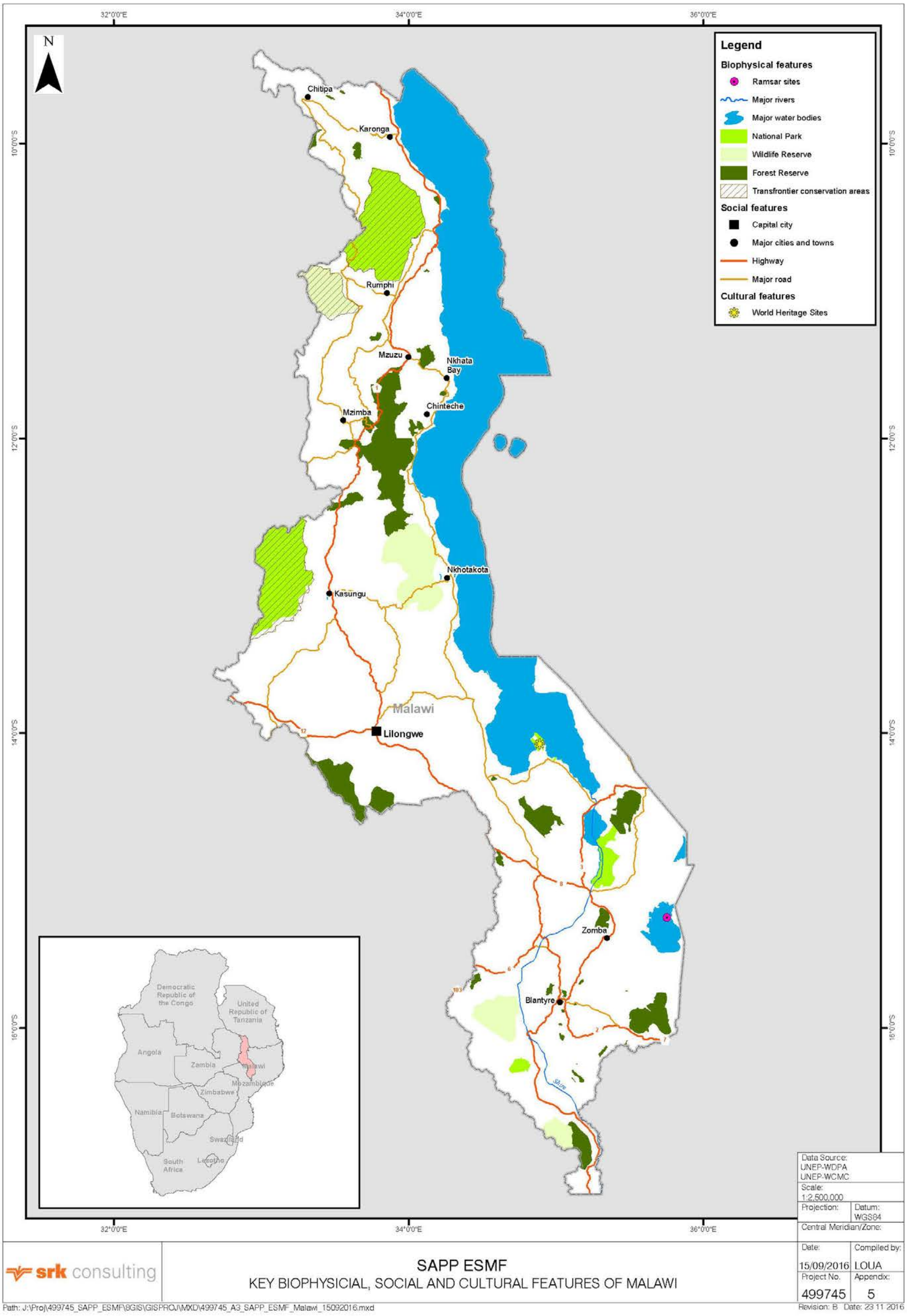
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Malawi	Malawi has a sub-tropical climate, which is relatively dry and strongly seasonal. The warm-wet season stretches from November to April, during which 95% of the annual precipitation takes place.	Topographically, Malawi lies within the Great Rift Valley system. Lake Malawi/Nyasa/Niassa, a body of water some 580 km (360 mi) long and about 460 m (1,500 ft) above sea level, is the country's most prominent physical feature. About 75% of the land surface is plateau between 750 m and 1,350 m (2,460 and 4,430 ft) above sea level. Highland elevations rise to over 2,440 m (8,000 ft) in the Nyika Plateau in the north and at Mt. Sapitwa (3,000 m/9,843 ft). The lowest point is on the southern border, where the Shire River approaches its confluence with the Zambezi at 37 m (121 ft) above sea level. *http://www.nationsencyclopedia.com/Africa/Malawi-TOPOGRAPHY.html#ixzz4EwKHV1vu*		Land use: • Agricultural land 59.2%; • Arable land 38.2%; • Permanent crops 1.4%; • Permanent pasture 19.6%; • Forest 34%; and • Other 6.8%. (2011 est.)	The major ecosystems in Malawi are terrestrial and aquatic (the latter comprising around 20% of the total surface area). The greatest diversity of plants and animals exists in the country's 97 protected areas (90% of which are forest reserves). Malawi has a total of over 6,000 flowering plant species, of which 122 are endemic, and 248 species are threatened with extinction. Animal species comprise both vertebrates and invertebrates. There are about 192 mammal species in Malawi, of which 8 are listed as threatened under IUCN (2013). About 83 species of amphibians have been recorded in Malawi, of which 6 species are endemic and 12 threatened. The country has 145 species of reptiles, of which 12 are endemic and six rare. There are 630 known bird species, of which 4 are endemic and 7 threatened. The total number of fish species found in Malawi is estimated to be in excess of 1000 species. Over 800 fish species have been described in Lake Malawi/Nyasa/Niassa, 95% being haplochromine cichlids, and 99% of which are endemic to the Lake. *(Convention on Biological Diversity, 2016)*	17% of Malawi is protected area. Of that: • 17% is Land Area Protected; and • 0% Marine Area Protected. There are 56 protected areas in Malawi. *(InforMEA, 2016)*	• Population 17,964,697 • Life expectancy at birth: o Male 58.67 years; and o Female: 62.69 years (2015 est.). • Literacy: Percentage of age 15 and over that can read and write: o Male 73%; and o Female 58.6% (2015 est.). • Unemployment: Ages 15-24: Male 9.1%; and Female 8.2% (2013 est.). • The economy depends on substantial inflows of economic assistance from the IMF, the World Bank, and individual donor nations. In 2006, Malawi was approved for relief under the Heavily Indebted Poor Countries program; • Since 2009, however, Malawi has experienced some setbacks, including a general shortage of foreign exchange, which has damaged its ability to pay for imports, and fuel shortages that hinder transportation and productivity; and • The government faces many challenges, including developing a market economy, improving educational facilities, addressing environmental problems, dealing with HIV/AIDS, and satisfying foreign donors on anti-corruption efforts. *(Malawi, CIA, 206).*	• Given its relatively small land-mass, large (and growing) population and heavy dependence on fuel wood, Malawi is an increasingly energy-stressed country; • The National Energy Policy estimates that 93% of total energy demand is met by biomass energy. Less than 7% of the 14 million people are connected to the national grid. The connected demand far exceeds the supply of 320 MW installed generation capacity; • Most of the charcoal is consumed in urban areas – representing 46% of total demand. Unlike in many neighbouring countries, firewood is still available in all four major cities of Malawi as well as in the district capitals; • Even in urban areas, firewood is mainly used in open three-stone fires; • Charcoal in Malawi is mostly unsustainably produced from live trees: over 60% of the charcoal is made from wood originating from protected Forest Reserves and National Parks; • One of the poorest countries in the world, it is estimated that Malawi's GDP would be 5.3% higher if such unsustainable use of natural resources ended; • Maplecroft's Climate Change and Environment Risk Atlas shows that Malawi is increasingly vulnerable to the impacts of climate change. *(National Statistics Office Zomba: Malawi Demographic and Health Survey 2010)*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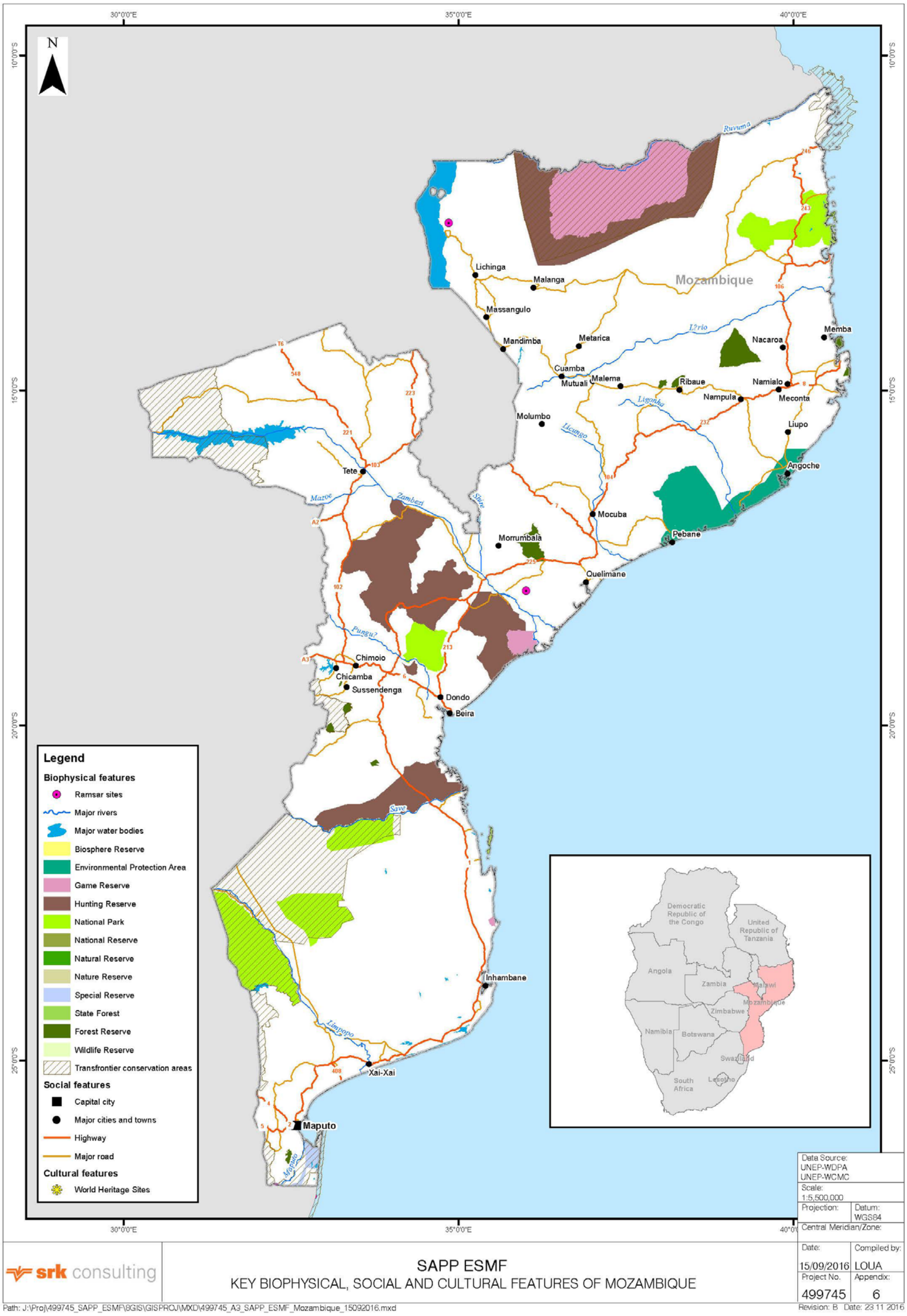
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	• Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Mozambique	Mozambique has a tropical climate with two seasons: • A wet season from October to March; and • A dry season from April to September. Climatic conditions vary depending on altitude. Rainfall is heavy along the coast and decreases in the north and south. *(World Travel guide, Mozambique)*	Mozambique is 44% coastal lowlands, rising toward the west to a plateau 150 to 610 m (500–2,000 ft) above sea level and on the western border to a higher plateau, 550 to 910 m (1,800–3,000 ft), with mountains reaching a height of nearly 2,440 m (8,000 ft). The highest mountains are Namuli (2,419 m/7,936 ft) in Zambézia Province and Binga (2,436 m/7,992 ft) in Manica Province on the Zimbabwean border. The most important rivers are: The Zambezi (flowing southeast across the center of Mozambique into the Indian Ocean); The Limpopo in the south; The Save (Sabi) in the center; and The Lugenda in the north. The most important lake is the navigable Lake Niassa/Nyasa/Malawi. Lake Cahora Bassa was formed by the impoundment of the Cahora Bassa Dam. In the river valleys and deltas, the soil is rich and fertile, but southern and central Mozambique have poor and sandy soil, and parts of the interior are dry. *http://www.nationsencyclopedia.com/Africa/Mozambique-TOPOGRAPHY.html#ixzz4EwJztkI6*		Land use: • Agricultural land 56.3%; • Arable land 6.4%; • Permanent crops 0.3%; • Permanent pasture 49.6%; • Forest 43.7%; and • Other 0% (2011 est.).	• Mozambique possesses five phytogeographical regions with Miombo, Mopane, undifferentiated woodlands and coastal mosaics being the most common; • High importance biodiversity sites include the Gorongosa Mountains, the Great Inselberg Archipelago of Quirimbas and the Chimanimani Massif; • Three biodiversity hotspots are found in Mozambique: The Coastal Forests of Eastern Africa, the Maputaland-Pondoland-Albany and the Eastern Afromontane. The Zambezian Coastal Flooded Savannah is an eco-region unique to Mozambique; • According to national estimates, Mozambique is home to about 5,500 species of flora and 4,271 species of terrestrial wildlife, of which 72% are insects, 17% birds, 5% mammals and 4% reptiles. Several of these are endemic to Mozambique. A total of 300 species are on the IUCN Red List in Mozambique, of which 120 are threatened; and • With a 2,770 km coastline, Mozambique has several marine and coastal habitats, the most important being the coral reefs, mangroves and seagrass meadows. Notable species recorded along the coastline include the dugong, 7 species of dolphin, humpback whales, 77 hermatypic species of coral and 5 species of turtle. *(Convention on Biological Diversity, 2016)*	19% of Mozambique is protected area. Of that: • 17% is Land Area Protected; and • 2% Marine Area Protected. There are 47 protected areas in Mozambique. *(InforMEA, 2016)*	• Population is 25,303,113; • Life expectancy at birth: o Male 52.18 years; and o Female 53.72 years (2015 est.). • Literacy: Percentage of age 15 and over that can read and write: o Male 73.3%; and o Female 45.4% (2015 est.). • Mozambique grew at an average annual rate of 6%-8% in the decade up to 2015, one of Africa's strongest performances; • Mozambique's ability to attract large investment projects in natural resources is expected to sustain high growth rates in coming years, although weaker global demand for commodities is likely to weaken expected revenues from these vast resources, including natural gas, coal, titanium, and hydroelectric capacity; • A substantial trade imbalance persists, although aluminum production from the Mozal Aluminum Smelter has significantly boosted export earnings in recent years; and • In 2012, The Mozambican Government took over Portugal's last remaining share in the Cahora Bassa Hydroelectricity Company, a significant contributor to the Southern African Power Pool. The government has plans to expand the Cahora Bassa Dam and build additional dams to increase its electricity exports. *(Mozambique CIA, 2016)*	• Mozambique has considerable but under exploited energy resources, including natural gas, coal, hydro, oil, solar, biomass and wind; • Access to electricity is among the lowest in the world, especially in rural areas where only 1% of the population is supplied; • Mozambique has considerable energy resources with an estimated hydropower potential of 12,000 MW as well as gas reserves (estimated at reaching 700 billion cubic metres) and vast coal reserves (estimated to reach 140 million TJ) with the potential of generating approx. 500 MW and 5,000 MW respectively. • In recent years, the increase in power consumption has been significant. 6 to 8 % average annually; • Electricidade de Moçambique (EdM) (Mozambique's national power company) generates approx. 136 MW (61 MW from hydro and 75 MW from diesel and gas). The remaining demand is supplied through a purchase agreement with Cahora Bassa, a hydropower plant with an installed capacity of 2,075 MW; and • The number of consumers has grown with more than 10% annually since the year 2000 and was about 850,000 in 2010. At present still only 16% of the population has access to electricity. Power demand forecasts indicate that with an average projected growth rate of 6% p.a. Mozambique will reach a maximum demand of 1,350 MW by 2030 and a projected consumption of 8,300 GWh.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Biophysical features
Ramsar sites
Major rivers
Major water bodies
Biosphere Reserve
Environmental Protection Area
Game Reserve
Hunting Reserve
National Park
National Reserve
Natural Reserve
Nature Reserve
Special Reserve
State Forest
Forest Reserve
Wildlife Reserve
Transfrontier conservation areas
Social features
Capital city
Major cities and towns
Highway
Major road
Cultural features
World Heritage Sites
Democratic Republic of the Congo
United Republic of Tanzania
Angola
Zambia
Malawi
Mozambique
Zimbabwe
Namibia
Botswana
Swaziland
South Africa
Lesotho
Data Source: UNEP-WDPA UNEP-WCMC
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Projection:
Datum: WGS84
Central Meridian/Zone:
Date: 15/09/2016
Compiled by: LOUA
Project No. 499745
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SAPP ESMF
KEY BIOPHYSICAL, SOCIAL AND CULTURAL FEATURES OF MOZAMBIQUE
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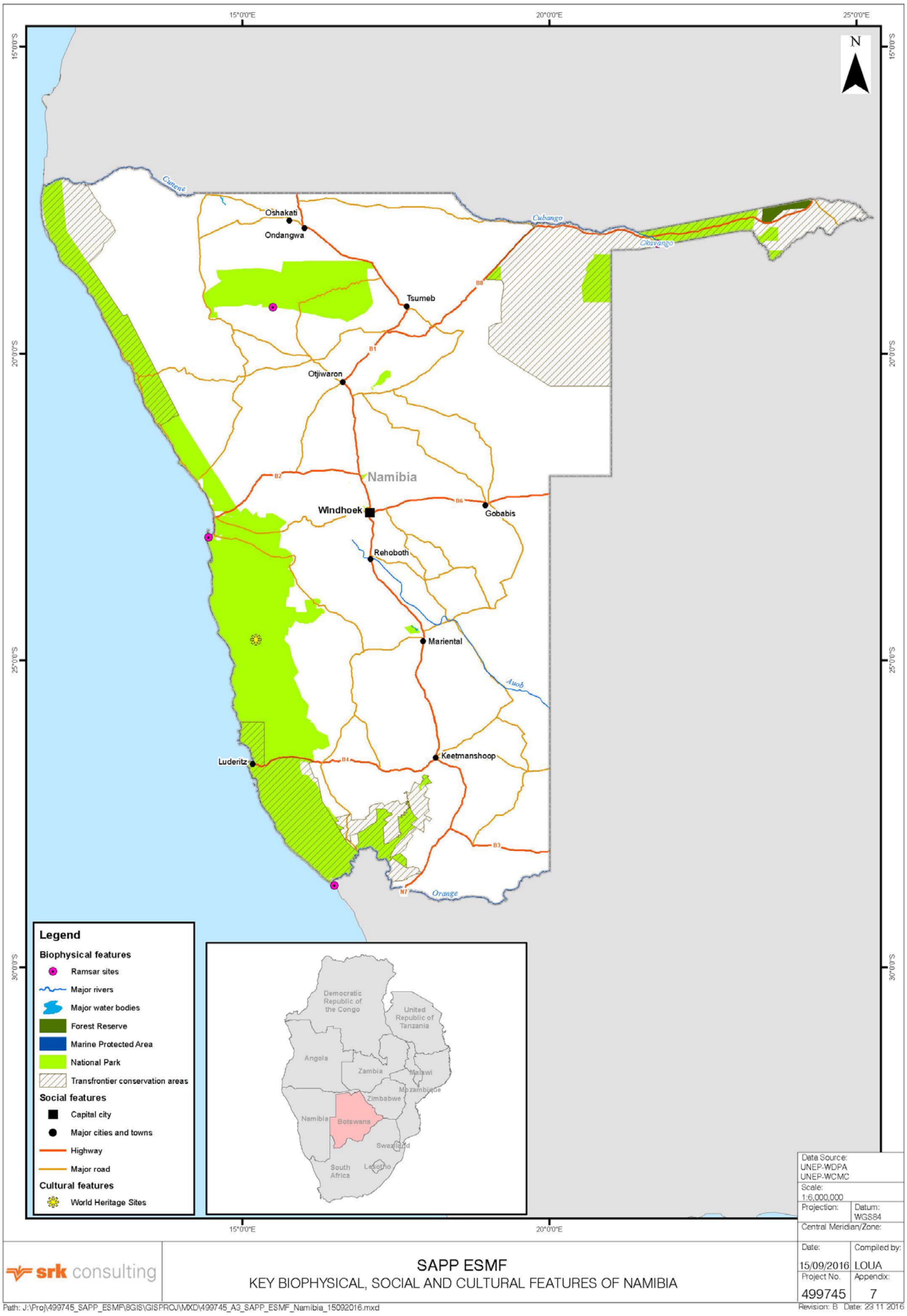
Revision: B Date: 23 11 2016

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Namibia	Temperatures increase by about 6°C for every 1000m you descend (or 3.5°F per 1000ft). As a result, Namibia's parks are hotter, especially those located in the desert. Rainfall is higher in the far north, including Etosha and the Caprivi Strip. Further south the climate is hotter and drier.	The Central Plateau is an extensive area of high but level country whose underlying rocks and soils are of volcanic origin; hence it is sometimes referred to as the Volcanic Plateau.	The major catchments in Namibia are as follows: • Ekuma River; • Fish River; • Hoanib River; • Khan River; • Kunene River; • Kuiseb River; • Kwando River; • Nossob River; • Okavango River; • Omaramba River; • Omaruru, River; • Orange River; • Oshigambo River; • Swakop River; • Tsauchab River; • Ugab River; and • Zambezi River	Land use: • Arable land 0.87%; • Permanent crops 0.01%; and • Other 99.02%. *(Focus on Land in Africa, 2016)*	• Namibia is renowned for its breathtaking landscapes, abundance of wildlife and cultural diversity; • Number of species: 2413 o Producer 723; o Herbivore 497; o Carnivore 994; o Omnivore 38; and o Decomposer 33. • Habitat: o Terrestrial 1974; o Aquatic 258; and o Marine 185. • Occurrence: o Indigenous 2247; o Alien 101 o Resident 758; o Migrant 174; o Occasional vagrant 70; o Perennial 633; o Annual 95; o Diurnal 940; and o Nocturnal 228. • Endemism: o Widespread 1960; and o Endemic 439. • IUCN Conservation status: o Not Evaluated 1369; o Least Concern 922; o Threatened 126; and o Legal status 868 species. *(Namibian Biodiversity Database, 2015)*	40% of Namibia is protected area. Of that: • 38% is Land Area Protected; and • 2% Marine Area Protected. There are 146 protected areas in Namibia. *(InforMEA, 2016)*	• Population 2,113,077; • Life expectancy at birth: o Male 52.48 years; and o Female: 51.89 years (2011 est.). • Literacy: Percentage age 15 and over that can read and write o Male: 84.4%; and o Female: 83.7% (2003 est.). *(Census Summary Results". National Planning Commission of Namibia. Retrieved 21 February 2012.)* • Namibia is the world's fifth-largest producer of uranium. The Chinese owned Husab uranium mine in expected to start producing uranium ore in 2017. Once the Husab mine reaches full production, Namibia is expected to become the world's second-largest producer of uranium; • The mining and quarrying sectors employ 2% of the population; • Namibia's economy remains vulnerable to world commodity price fluctuations, and drought; • Namibia normally imports about 50% of its cereal requirements; in drought years, food shortages can be a problem in rural areas; and • A high per capita GDP, relative to the region, hides one of the world's most unequal income distributions. A priority of the current government is poverty eradication. *(Namibia, CIA, 2013)*	• The Namibian electricity sector mainly relies on electricity imports from the Southern African Power Pool; • Namibia has one of the best solar regimes in the world with an average high direct insolation of 2,200 kWh/m2/a and minimum cloud cover. Namibia has one of the best wind RES in Africa since it is located in the more extreme latitudes, away from the atmospheric heating and the earth's rotation negative impacts; • It has been calculated that 26 million hectares of land are invaded in Namibia. If this amount of bush was used to produce electricity, the same calculations shows that the potential generation would be 1,100 TWh which at the Namibian scale can be considered as unlimited; • In 2010, 64% of the electricity was generated by Ruacana hydropower plant. Ruacana hydropower now has a capacity of 332 MW; • Nampower is examining the possibility of installing a second hydropower plant on Kunene River, downstream to Ruacana; and • In 2005, the Government of the Republic of Namibia initiated a Renewable Energy Programme with support from the Global Environment Facility (GEF).



Namibia
Windhoek
Oshakati
Ondangwa
Tsumeb
Otjiwarong
Gobabis
Rehoboth
Mariental
Keetmanshoop
Luderitz
Cunene
Cubango
Okavango
Auob
Orange
Legend
Biophysical features
Ramsar sites
Major rivers
Major water bodies
Forest Reserve
Marine Protected Area
National Park
Transfrontier conservation areas
Social features
Capital city
Major cities and towns
Highway
Major road
Cultural features
World Heritage Sites
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Central Meridian/Zone:
Date: 15/09/2016
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Project No. 499745
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KEY BIOPHYSICAL, SOCIAL AND CULTURAL FEATURES OF NAMIBIA
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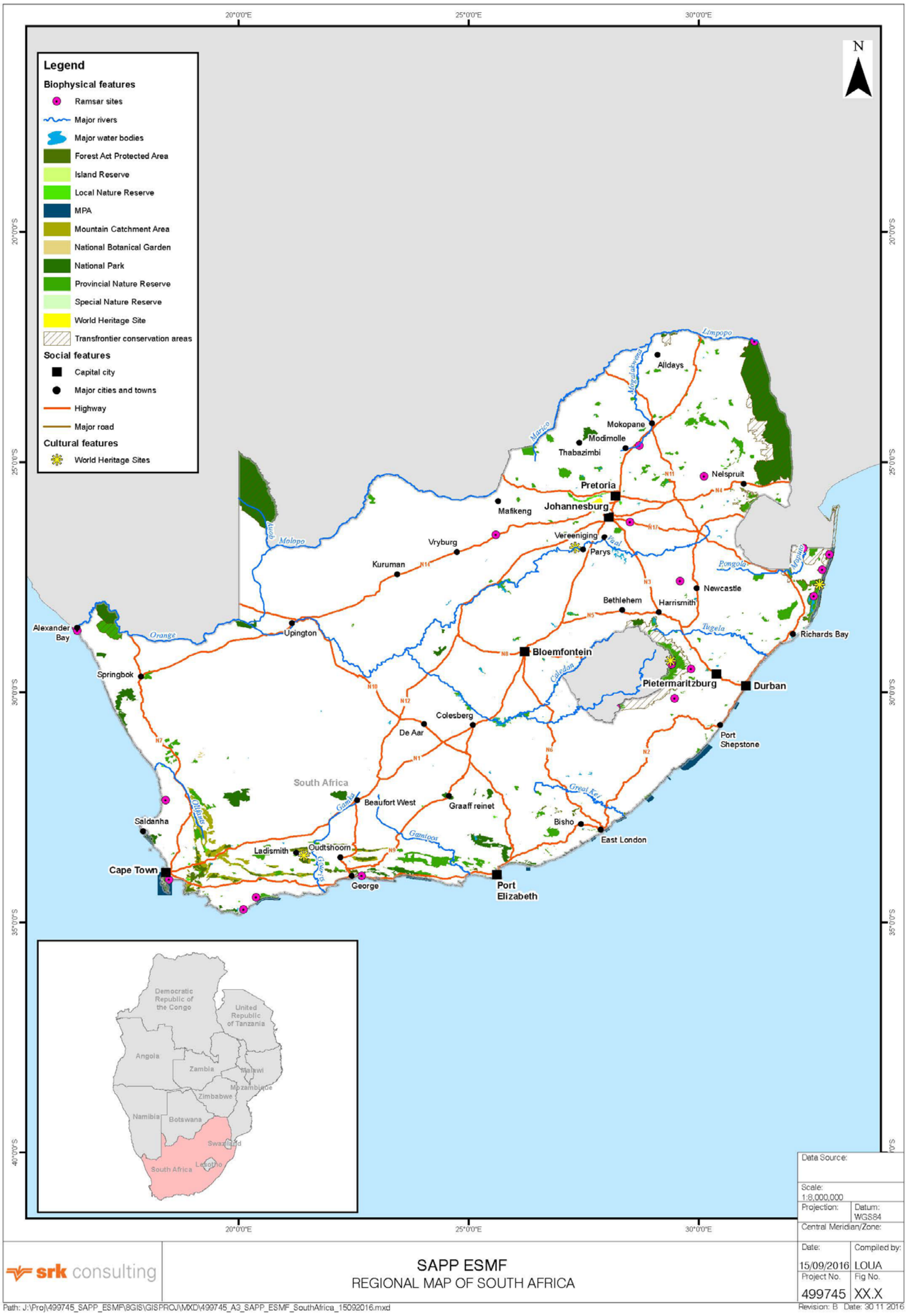
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
South Africa	South Africa's climatic conditions generally range from Mediterranean in the southwestern corner of South Africa, to temperate in the interior plateau. The northeast is subtropical whilst a small area in the northwest has a desert climate. Most of the country has warm, sunny days and cool nights.	Mean altitude 1,200 m (3,900 ft). 40% of the surface is at a higher elevation. There are three major zones: the marginal regions, 80 to 240 km (50–150 mi) in the east to 60–80 km (35–50 mi) in the west and including the eastern plateau slopes.	Two rivers drain the interior plateau: • The Orange (with its tributary the Vaal), which flows into the Atlantic Ocean; and • The Limpopo, which empties into the Indian Ocean through Mozambique.	It is estimated that close to 18% of South Africa's natural land cover is transformed, mainly by: • Cultivation (10.46%); • Degradation of the natural cover (4.47%); • Urban land use (1.51%); and • Forestry (1.41%). *(Statics SA, 2012)*	• South Africa occupies 2% of the world's surface area it is home to nearly 10% of the world's plant species (24 000 species), about 7% of the world's vertebrate species, and 5.5% of the world's known insect species (only about half of the latter have been described). • South Africa is ranked as the 5th richest country in Africa in terms of the number of endemic species and 24th in the world. • In addition to its high terrestrial biodiversity the country also has a high marine biodiversity profile. More than 11 000 species are found in South African waters, amounting to about 15% of global species, with in excess of 25% of these marine species (or 3 496 species) being endemic to South Africa *(SOER, 2012)*	20% of South Africa is protected area. Of that: • 9% is Land Area Protected; and • 11% Marine Area Protected. There are 1,517 protected areas in South Africa *(InforMEA, 2016)*	• Population 55 million (2016); • Literacy: Percentage of age 15 and over that can read and write o Male 95.5%; and o Female 93.1%. (2015 est.) • Unemployment: o Male 48%; and o Female 55.5%. (2013 est.) • Economic growth has decelerated in recent years, slowing to just 1.5% in 2014. South Africa's economic policy has focused on controlling inflation; however, the country faces structural constraints that also limit economic growth, such as skills shortages, declining global competitiveness, and frequent work stoppages due to strike action. The current government faces growing pressure from urban constituencies to improve the delivery of basic services to low-income areas and to increase job growth *(Stats SA, 2016)*; • Major Infectious diseases: o Food or waterborne diseases: ▪ Bacterial diarrhea; ▪ Hepatitis A; and ▪ Typhoid fever o Water contact disease: ▪ Schistosomiasis *(CIA South Africa, 2013)*	• South Africa depends heavily on pulverized fuel power stations, with a large percentage (63%) of its electricity coming from coal. Increased total electricity demand over the past 25 years has resulted in a corresponding increase in coal consumption (by 23% since 1992). • Industry is the greatest consumer of electricity, followed by the transport and commercial sectors. • There are 7 types of energy supply in South Africa namely: coal which makes up 69,0%, biofuels and waste which makes up 10.7%, crude oil makes up 14,8%, nuclear makes up 2.4%, gas makes up 2,9% Hydro makes up 0,1% and Solar wind makes up 0,1% *(SA Energy Supply, 2012)*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Local Nature Reserve
MPA
Mountain Catchment Area
National Botanical Garden
National Park
Provincial Nature Reserve
Special Nature Reserve
World Heritage Site
Transfrontier conservation areas
Social features
Capital city
Major cities and towns
Highway
Major road
Cultural features
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Durban
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REGIONAL MAP OF SOUTH AFRICA
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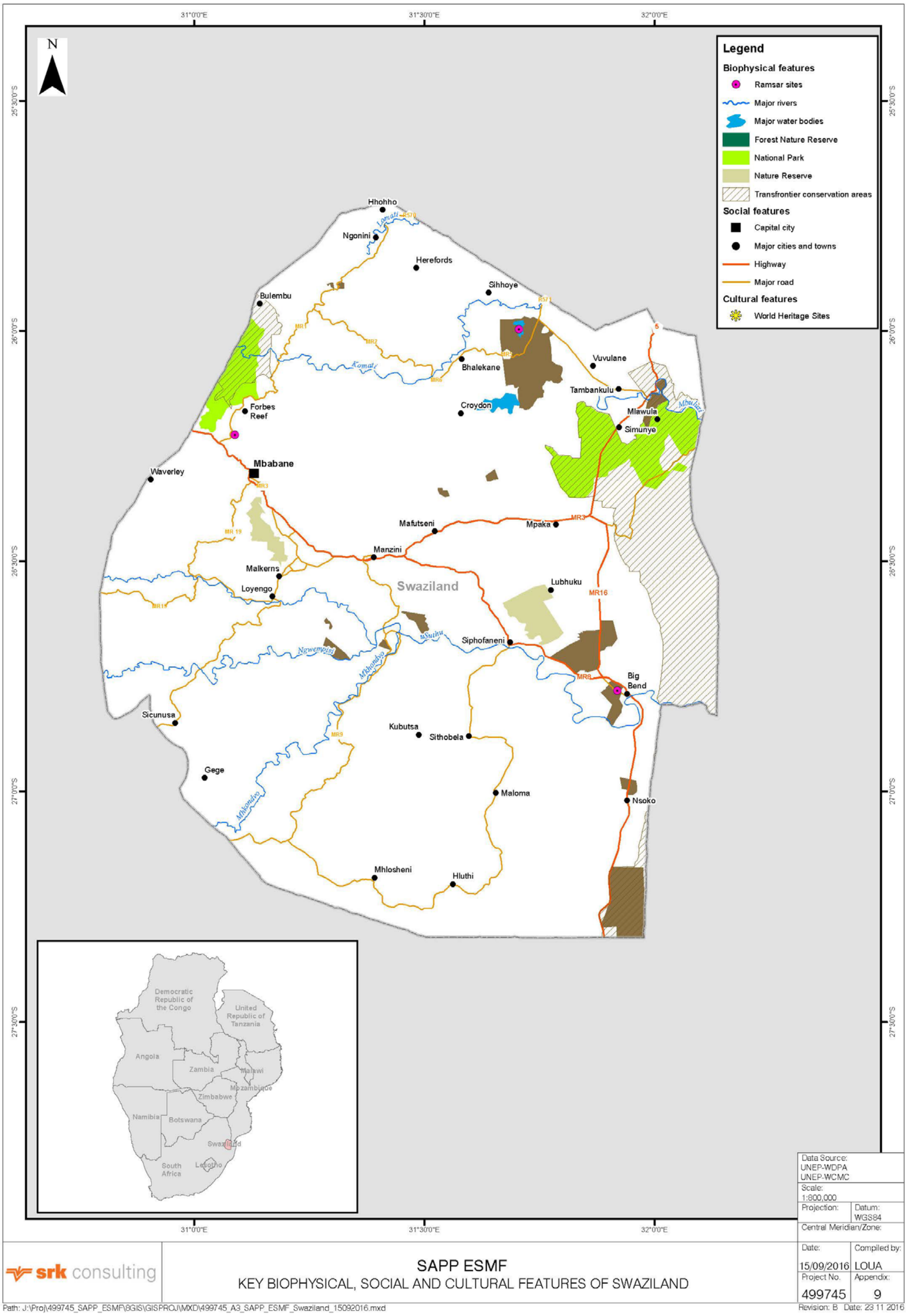
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Swaziland	The climate of Swaziland varies from tropical to near temperate. The seasons are the reverse of those in the Northern Hemisphere with December being mid-summer and June mid-winter. Generally speaking, rain falls mostly during the summer months, often in the form of thunderstorms. Winter is the dry season. *(World Travel guide, Swaziland)*	The country is divided west-to-east into four well defined regions, the first three being of roughly equal breadth. The four regions extend north and south and are known as the Lebombo plain and escarpment and high, middle, and low veld. • The Lebombo plain, at an average height of 610 m (2,000 ft), extends to the Lebombo escarpment, which is part of the Lebombo Mountains in the east; • The high veld on the west has an average altitude of 1,050 m to 1,200 m (3445 to 3,937 ft); • The middle veld averages about 450 to 600 m (1,476 to 1,969 ft); and • The low or bush veld less than 300 m (984 ft). The entire country is traversed by rivers or streams, making it one of the best watered areas in southern Africa. http://www.nationsencyclopedia.com/Africa/Swaziland-TOPOGRAPHY.html#ixzz4EwJKnI39	Swaziland has many drainage basins, however one of the most important ones, the Incomati River Basin, is one of the 15 international river basins shared by southern African countries. It covers an area of approximately 47,000 km² and is shared between the Republic of Mozambique (31%), the Republic of South Africa (63%) and the Kingdom of Swaziland (6%). The Incomati River flows from the eastern part of South Africa, through the north of Swaziland, into the southern part of Mozambique where it discharges into the Indian Ocean. Even though the Incomati is a relatively small basin, it is of strategic importance, located in an area of intense development pressure, which results in a considerably high demand for its water resource. *(JIBS. 2001. Joint Inkomati Basin Study Phase 2. Consultec in association with BKS Acres. Final Draft, April 2001)*	Land use: • Arable land 10.08%; • Permanent crops 0.86%; and • Other 89.06%. (2011)	• Although small in size, Swaziland is blessed with a rich diversity of plants and animals. • Swaziland has less than 1% of southern Africa's total land area but 14% of the taxa recorded in the sub-region have been recorded in the country. • The country's steep gradients of climate, topography, and soil properties all contribute to the rich biodiversity. • The eastern part of the country lies within the Maputaland center of plant diversity recognized as one of the world's hotspots of floral and faunal species richness and endemism. • The western part of Swaziland lies in the Drakensberg Escarpment Endemic bird area, another area of global significance. • 3441 plant species representing 1124 genera and 244 families have been recorded in the country. • Invertebrates have not been adequately surveyed, however 265 families and about 1,300 genera of arthropods have been recorded • Vertebrates are the only well documented animal group in the country. To date 813 species (445 genera in 144 families) have been recorded. • One endemic vertebrate species a lizard (Afroedura major) is known. *(Convention on Biological Diversity, 2016)*	4% of Swaziland is protected area. Of that: • 4% is Land Area Protected; and • 0% Marine Area Protected. There are 20 protected areas in Swaziland. *(InforMEA, 2016)*	• Population 1,435,613; • Literacy: Percentage of age 15 and over that can read and write - o Male 88.4%; and o Female 87.3%. • School life expectancy (primary to tertiary education): o Male 12 years; and o Female 11 years (2013). • Swaziland depends on South Africa for 60% of its exports and for more than 90% of its imports. Swaziland's currency is pegged to the South African rand, effectively relinquishing Swaziland's monetary policy to South Africa. The government is heavily dependent on customs duties from the Southern African Customs Union (SACU); • Swaziland's GDP per capita makes it a lower middle-income country, but its income distribution is highly skewed, with an estimated 20% of the population controlling 80% of the nation's wealth; • Swaziland has the world's highest HIV prevalence rate; • Subsistence agriculture employs approximately 70% of the population; and • The manufacturing sector diversified in the 1980s and 1990s, but manufacturing has grown little in the last decade. Sugar is now the main export earner. *(Swaziland, CIA, 2013).*	• Energy sources: Total installed electricity capacity (2012) - 69.4 MW: o Hydropower 60.4MW; and o Diesel 9MW • Total primary energy supply - 1,703 ktoe; • Combustible Renewables and Waste - 48%; • Petroleum Products - 23%; • Coal - 16%; • Electricity Imports - 13%; and • Biomass, especially wood fuel, constitutes about 90% of the total final energy consumption, and is still dominant in cooking and heating in rural areas. Biomass is not only the major fuel in households, but also the major source of electricity self-generation in the sugar, pulp and saw mill industries. *(SEC, 2011)*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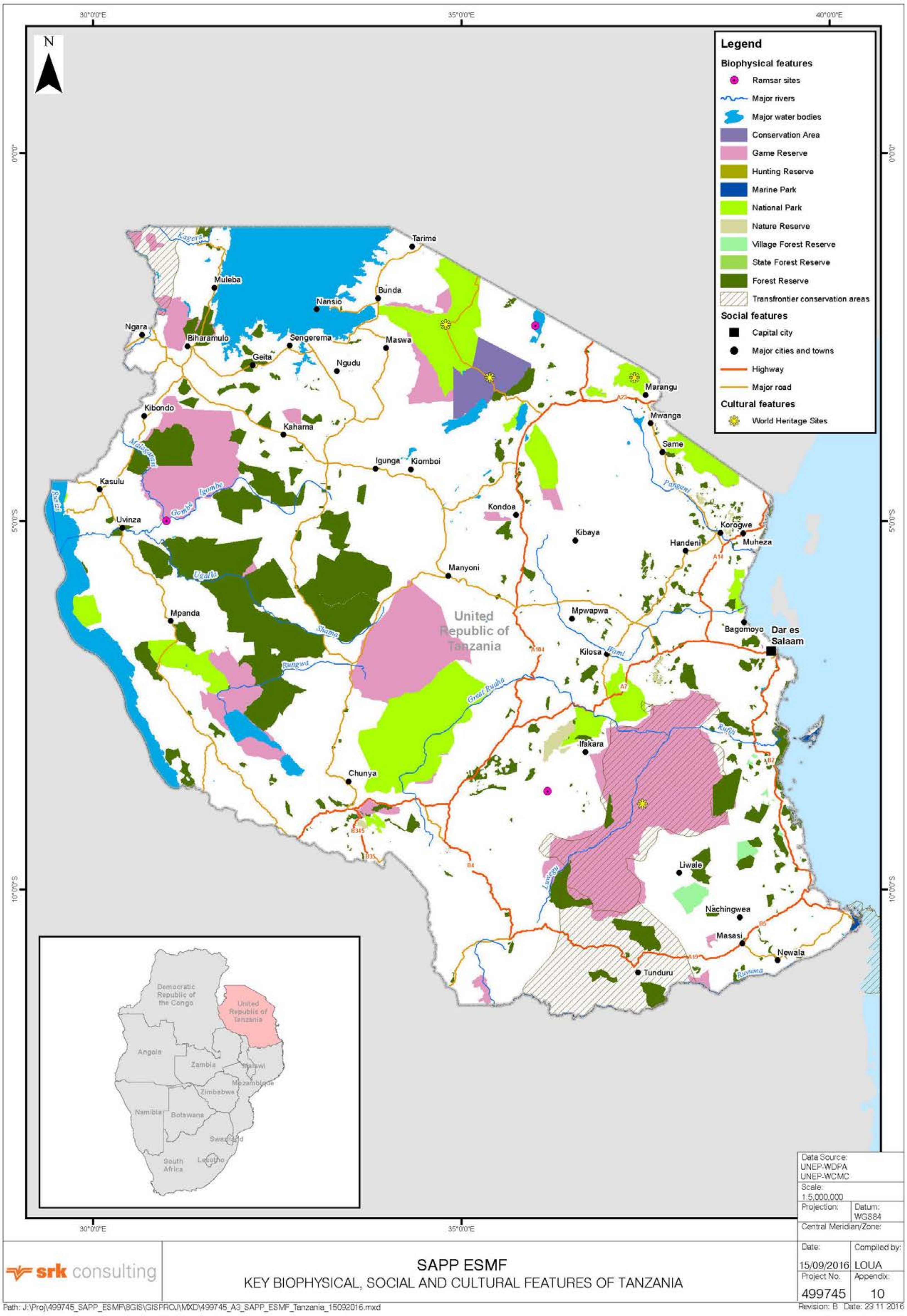
Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	• Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Tanzania	The climate is tropical and the coastal areas are hot and humid, while the northwestern highlands are cool and temperate. There are two rainy seasons: • Short rains (generally October to December); and • Long rains (March to June). *(UNDP Climate Change Country Profiles, 2013)*	Tanzania lies at an altitude of over 200 m (660 ft). A plateau averaging 900–1,800 m (3,000–6,000 ft) in height makes up the greater part of the country. Mountains are grouped in various sections. The Pare range is in the northeast, and the Kipengere Range is in the southwest. Kilimanjaro (5,895 m/19,340 ft), in the north, is the highest mountain in Africa. Three large lakes border Tanzania: • Victoria, (2nd largest freshwater lake in the world); • Tanganyika (2nd deepest lake in the world); and • Lake Nyasa/ Niassa/ Malawi. Lakes within Tanzania include: Natron, Eyasi, Manyara, and Rukwa. *(http://www.nationsencyclopedia.com/Africa/Tanzania-TOPOGRAPHY)*	The basin is situated in the semi-arid region of Tanzania. The mean annual rainfall ranges from 500 mm/yr at Bahi to 900mm/yr in the highlands of Mbulu district. Rainfall varies greatly from year to year. The Internal Drainage Basin is described by rivers/streams draining into a group of inland water bodies (lakes) that are located around the north-central part of the country. Total basin area on the Tanzanian side is about 153,800 km2. The major drainage systems in this basin includes: Lake Eyasi System, which drains areas in North Tabora Region and East Shinyanga by the Wembere and Manonga river systems, Lake Manyara System and Bubu complex where important features are the Bubu and Bubu swamps. *(United Republic of Tanzania, Ministry of Water and Irrigation, 2014).*	Land use: • Arable land 12.25%; • Permanent crops 1.79%; and • Other 85.96%. Irrigated land covers 1,843 km² (712 sq. mi) (2003) *(Tanzania Stats, 2015)*	• Approximately 38% of Tanzania's land area is set aside in protected areas for conservation; • Tanzania has 16 national parks, plus a variety of game and forest reserves, including: • the Ngorongoro Conservation Area; • The Gombe Stream National Park (the site of Jane Goodall's ongoing study of chimpanzee behavior); • The Serengeti plain (where white-bearded wildebeest (Connochaetes taurinus mearnsi) and other bovids participate in a large-scale annual migration); • Tanzania is home to about 130 species of amphibians and over 275 reptile species, many of them strictly endemic and included in the International Union for Conservation of Nature's Red Lists of different countries; • Tanzania has developed a Biodiversity Action Plan to address species conservation; and • Is also home to 31 endemic species of amphibians, 18 endemic species of lizards, 9 species of snakes, 10 bird species, 40% of the world's wild coffee varieties, and about 80% of the famous African violet flowers *(National Report on the Implementation of the Convention on Biological Diversity, Tanzania, 2014).*	50% is protected area in Tanzania. Of that • 32% is Land Area Protected; and • 18% Marine Area Protected. There are 618 protected areas in Tanzania *(InforMEA, 2016)*	• Population 51,045,882 • Life expectancy at birth: o Male 60.34 years; and o Female: 63.13 years (2015 est.) • Literacy: Percentage of age 15 and over that can read and write Kiswahili (Swahili), English, or Arabic: o Male: 75.9%; and o Female: 65.4% (2015 est.) • Unemployment Rate in Tanzania averaged 11.46 percent from 2001 until 2014, reaching an all-time high of 12.90 percent in 2001 and a record low of 10.30 percent in 2014. *(National Bureau of Statistics (NBS) – Tanzania, 2014).* • Major Infectious diseases: o Food or waterborne diseases: • Bacterial diarrhea; • Hepatitis A; and • Typhoid fever. o Vector-borne diseases: • Malaria; • Dengue fever; and • Rift Valley fever. o Water contact diseases: • Schistosomiasis; and • Leptospirosis. o Animal contact disease: • Rabies *(CIA, Tanzania, 2013)*	• Tanzania has abundant and diverse indigenous energy resources which include; wood fuel and other biomass fuels, hydropower, natural gas, coal, uranium, wind, geothermal and solar; • Since 85-90% of the population are not connected to the electricity grid, the overwhelming majority of households use wood and charcoal for cooking. As a total, biomass makes up close to 90% of the total primary energy consumption in Tanzania. • Other energy sources are (% by total primary energy consumption) o Petroleum (7.8%); o Natural gas (2.4%); o Hydropower (1.2%); and o Coal/peat (0.3%). • About 6.6 percent of primary energy, needs to be imported, primarily from Uganda (8 MW) and Zambia (5 MW). • Electricity makes up only 0.6% of total energy consumption. • In 2008, 4,414 GWh of electricity were generated in Tanzania, o 2 655 GWh (hydropower); o 1 600 GWh (natural gas); o 119 GWh (coal); and o 40 GWh (petroleum). • Total installed capacity amounted to 1,219 MW, of which 561 MW was hydropower and 658 MW thermal power. *(Tanzania Energy Situation, 2014)*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Hunting Reserve
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Nature Reserve
Village Forest Reserve
State Forest Reserve
Forest Reserve
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Highway
Major road
Cultural features
World Heritage Sites
United Republic of Tanzania
Tarime
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Bunda
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Maswa
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Igunga
Kiomboi
Kasulu
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Uvinza
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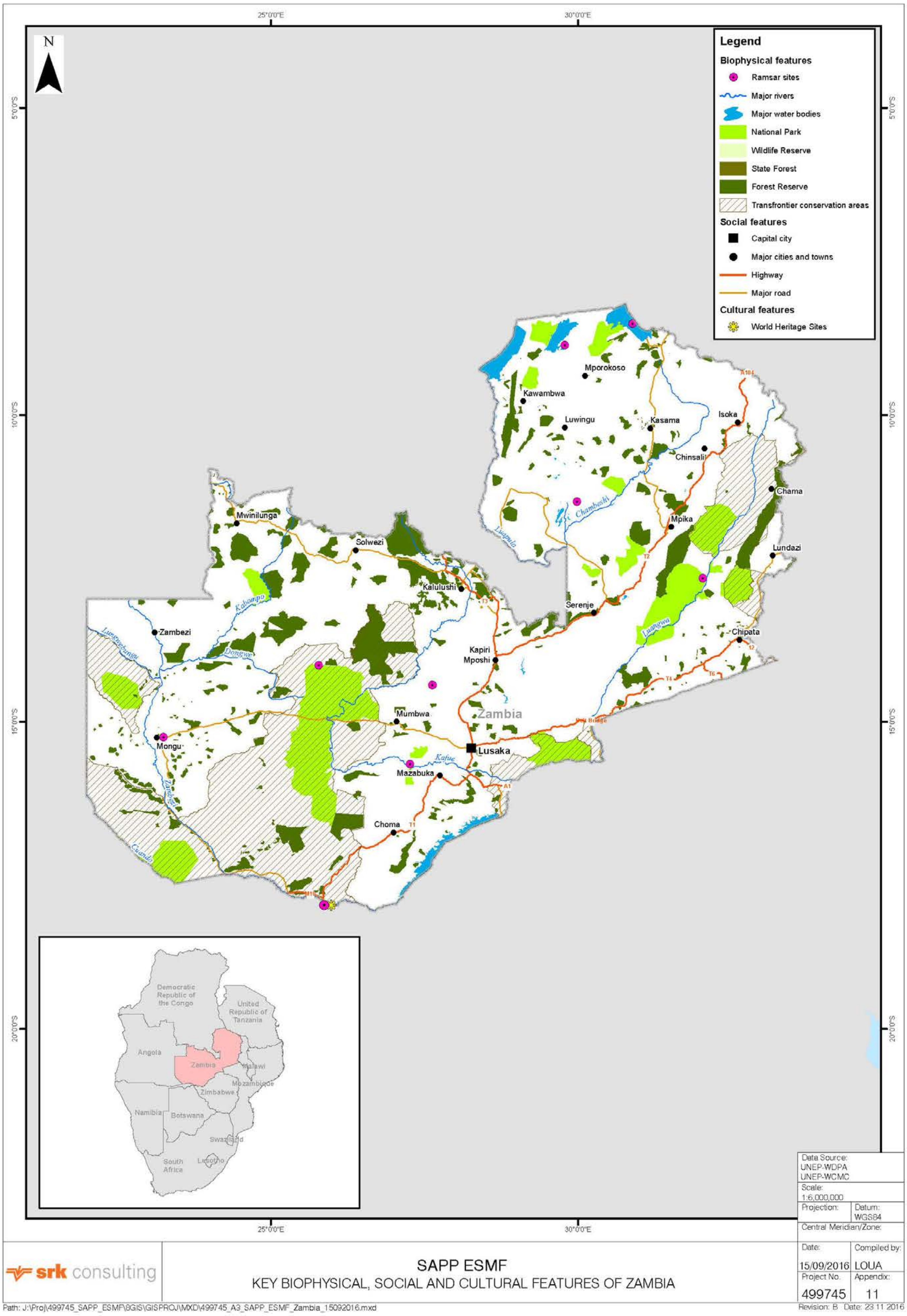
Revision: B Date: 23.11.2016

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Zambia	The climate of Zambia in Central and Southern Africa is tropical, modified by altitude (elevation). Most of the country is classified as humid subtropical or tropical wet and dry, with small patches of semi-arid steppe climate in the south-west.	Zambia is a high plateau lying between 910 and 1,370 m (3,000–4,500 ft) above sea level. In the northeast, the Muchinga Mountains exceed 1,800 m (5,900 ft) in height. Elevations below 610 m (2,000 ft) are encountered in the valleys of the major river systems. Plateau land in the northeastern and eastern parts of the country is broken by the low-lying Luangwa River, and in the western half by the Kafue River. Both rivers are tributaries of the upper Zambezi, the major waterway of the area. (*http://www.nationsencyclopedia.com/Africa/Zambia-TOPOGRAPHY*)	Zambia has three large natural lakes which can all be found in the northern area: • Lake Bangweulu; • Lake Mweru; and • Lake Tanganyika Lake Tanganyika, is the largest of the three lakes and has an area of about 12,770 km² (32,893 sq mi). Lake Bangweulu and the swamps at its southern end, cover about 9,840 km² (3,799 sq mi) and are drained by the Luapula River. Kariba, one of the world's largest manmade lakes, is on the southern border and was formed by the impoundment of the Zambezi by the construction of the Kariba Dam. (*http://www.nationsencyclopedia.com/Africa/Zambia-TOPOGRAPHY*).	Land use: • Agricultural 31.52%; • Protected areas 36.4%; • Forested land 66.32%; *(Focus on Land in Africa, 2016)*	• Zambia has 14 terrestrial ecosystems based on vegetation type with four main divisions: forest, thicket, woodland and grassland. Forests and woodlands are predominant and cover over 60% of the country's total land area; • The aquatic ecosystem consists of natural and man-made lakes and the major perennial rivers; • Zambia also has important agricultural biodiversity upon which more than 600,000 households depend directly for their livelihood; • Distribution pattern of the ecosystems is due to the prevailing rainfall pattern and may change in response to climate changes. A total of 7,774 species of organisms occur in Zambia; Microorganisms constitute 8%, plants 47% and fauna 45% of this biodiversity. There are at least 316 plant and animal Species that are endemic to Zambia, 174 are classified rare, while 31 species are endangered or vulnerable; and • The diversity of fauna has been estimated at 3,407 species of which 1,808 are invertebrates, 224 are mammals, 409 are fish species, 67 are amphibians, 150 are reptiles and 733 are birds. While the floristic diversity has been estimated at 4,600 species, 211 species of the total are endemic. Floristic diversity is dominated by herbs and woody plants.	38% of Zambia is protected area. Of that: • 38% is Land Area Protected; and • 0% Marine Area Protected. There are 518 protected areas in Zambia (*InforMEA, 2016*)	• Population 15,066,266 • Life expectancy at birth: o Male: 50.54 years; and o Female: 53.81 years. (2015 est.) • Literacy: Percentage that can read and write o Male: 70.9%; and o Female: 56%. (2015 est.) • Despite recent strong economic growth and its status as a lower middle-income country, widespread and extreme rural poverty and high unemployment levels remain significant problems, made worse by a high birth rate, a relatively high HIV/AIDS burden, and by market-distorting agricultural and energy policies; • The kwacha was Africa's worst performing currency during 2015. Zambia has raised $7 billion from international investors by issuing separate sovereign bonds in September 2012, April 2014, and July 2015, significantly increasing the country's public debt as a share of GDP; and • Poor management of water resources has also contributed to a power generation shortage, which has hampered industrial productivity and contributed to an increase in year-on-year inflation to 23% by March 2016. *(CIA, Zambia, 2013)*	Of the total installed Electricity Generation Capacity of Zambia (2,347 MW), hydropower is the most important energy source in the country (2,259 MW) 96%, followed by diesel contributing about 4% to the national supply. Zambia has three main electricity companies: • State-owned ZESCO; • Copperbelt Energy Corporation (CEC:LUSE); and • Lusemfwa Electricity Company. Zambia's demand for energy has risen due to the country's robust GDP growth of more than 6% p.a. for the past decade, particularly in the mining, manufacturing and agriculture sectors. According to the Zambia Development Agency (ZDA), the in-country demand for electricity has been growing at an average of about 3% (between 150 and 200 MW), each year. Zambia is part of the SAPP, in which the annual electricity consumption reaches 50,000 MW per year, with an installed capacity of 55,000MW. The annual growth rate of overall electric power consumption in the SAPP averages 5% per annum. With 40% of the water resources in the Southern African Development Community (SADC), Zambia has about 6,000 MW unexploited hydropower potential, while only about 2,259 MW (37%) has been developed. *(Zambia Energy, 2016)*



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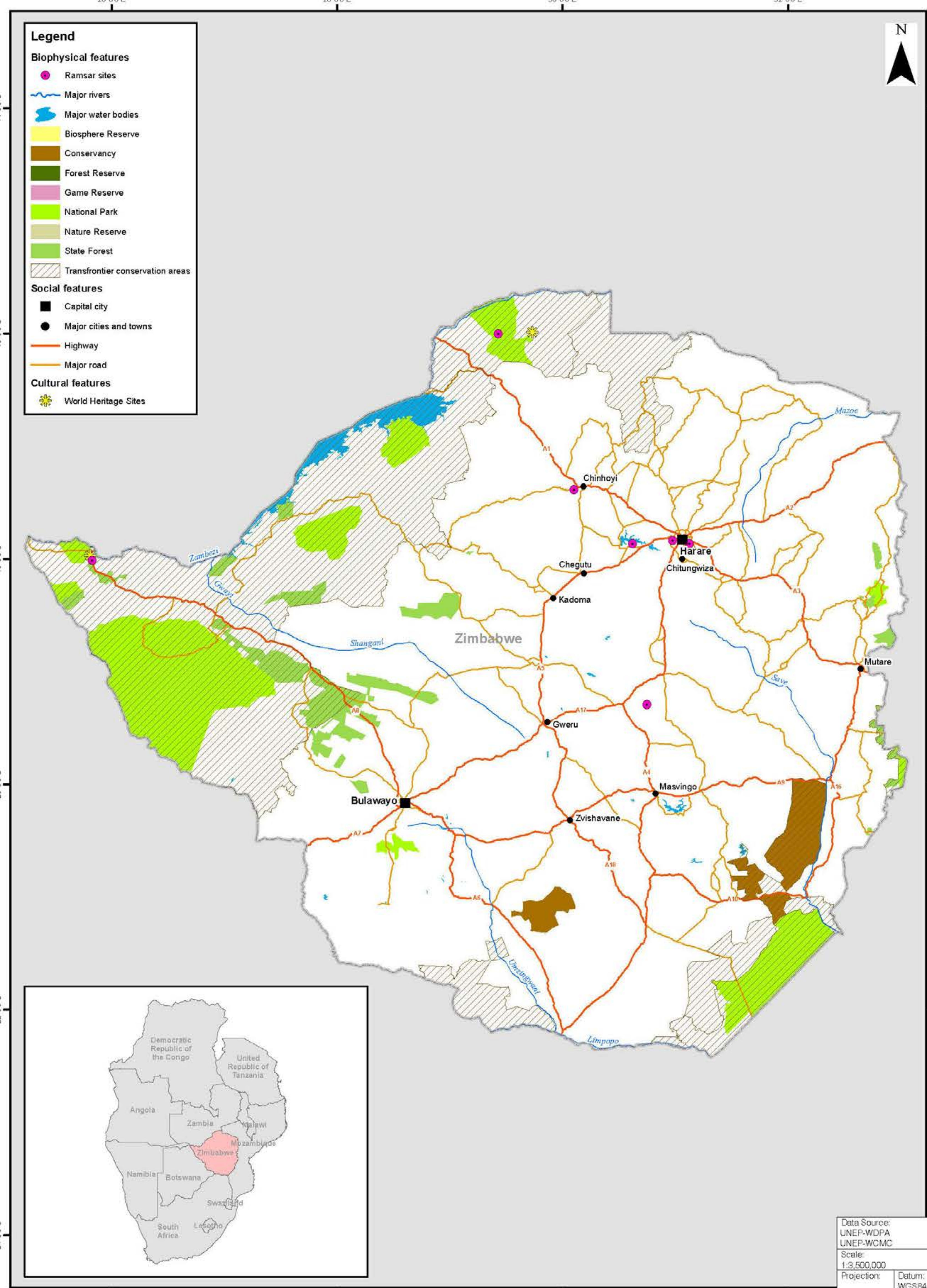
Revision: B Date: 23.11.2016

Country	Climatic zones	Topography	Drainage/ Hydrology	Land Uses	Biodiversity	Protected Areas/ World Heritage Sites	Social	Energy
Zimbabwe	The climate is tropical, although markedly moderated by altitude. There is a dry season, including a short cool season during the period May to September when the whole country has very little rain. The rainy season is typically a time of heavy rainfall from November to March. *(Travel guide, Zimbabwe)*	Most of Zimbabwe is rolling plateau, with over 75% of it lying between 600 and 1,500 m (2,000–5,000 ft) above sea level, and almost all of it over 300 m (1,000 ft). The area of high plateau, known as the Highveld, is some 650 km (400 mi) long by 80 km (50 mi) wide, and stretches northeast to southwest at 1,200 to 1,675 m (4,000–5,500 ft). This culminates in the northeast in the Inyanga mountains, reaching the country's highest point at Mt. Inyangani, 2,592 m (8,504 ft). On either side of the highveld is the middleveld, a plateau ranging from about 600 to 1,200 m (2,000–4,000 ft) in height. Below 610 m (2,000 ft) are areas making up the lowveld, wide and grassy plains in the basins of the Zambezi and the Limpopo. The highveld is a central ridge forming the country's watershed, with streams flowing southeast to the Limpopo and Sabi rivers and northwest into the Zambezi. Only the largest of the many rivers have an all-year-round flow of water http://www.nationsencyclopedia.com/Africa/Zimbabwe-TOPOGRAPHY.html#ixzz4EwK917GX		Land use: • Agricultural land 42.5%; • Arable land 10.9%; • Permanent crops 0.3%; • Permanent pasture 31.3%; • Forest: 39.5%; and • Other 18%	Zimbabwe presents a rich diversity of life forms. At species level, the country supports an estimated 4,440 vascular plant species, 214 of which are endemic, 672 bird species, 450 of which breed in Zimbabwe, though none are strictly endemic, 196 mammal species, 156 reptile species, 57 species of amphibians, 132 fish species. Exotic or introduced plant species number approximately 1,500. In terms of vegetation, Zimbabwe is well endowed with forests and woodlands covering 53% of the land area. A further 13% is covered by bushlands, while 0.3% of the area is under commercial plantations. Over a quarter of the woodland area is found on state lands. Although some species, such as insects have not yet been adequately documented, a general decline in biodiversity has been observed in recent years. The IUCN Red Data List reports numerous endangered and vulnerable mammal species across the country, among them, both the black and white rhinoceros, brown hyena, hippopotamus, lion and the African elephant. Fish species diversity and population in some of the major water bodies of the country are on the decline, due to over-fishing, water pollution, drying of water bodies and the introduction of invasive alien species. *(Convention on Biological Diversity, 2016)*	27% of Zimbabwe is protected area. Of that: • 27% is Land Area Protected; and • 0% Marine Area Protected. *(InforMEA, 2016)*	• Population14,229,541; • Life expectancy at birth: o Male 56.54 years; and o Female: 57.57 years (2015 est.). • Literacy: Percentage of age 15 and over that can read and write English: o Male 88.5%; and o Female 84.6% (2015 est.). • Unemployment: Ages 15-24, Total 8.7%: o Male 7.7%; and o Female 9.8% (2012 est.). • Zimbabwe's economy depends heavily on its mining and agriculture sectors; and • Following a decade of contraction from 1998 to 2008, the economy recorded real growth of more than 10% per year in the period 2010-13, before slowing to roughly 3% in 2014 due to poor harvests, low diamond revenues, and decreased investment. Lower mineral prices, infrastructure and regulatory deficiencies, a poor investment climate, a large public and external debt burden, and extremely high government wage expenses impede the country's economic performance. *(Zimbabwe, CIA, 2016)*	• Energy in Zimbabwe is a serious problem. Mainly, extensive use of firewood leads to deforestation and the electricity production capacity is too low for the current level of consumption. Fuelwood is the most important domestic fuel in Zimbabwe and was estimated to stand for about 50% of the total consumption in 2001; • Zimbabwe has 30 billion tons of coal in 21 known deposits. This could last for over 100 years at the 2001 rate of production; • With no oil or gas resources of its own, Zimbabwe depends on imports for this source of energy; • Electricity is generated at the Kariba Power Station (ca. 750 MW), the Hwange Thermal Power Station (installed capacity 920 MW) and three minor coal-fired stations. The governmental owned Zimbabwe Electricity Supply Authority (ZESA) is the countries power generating and distributing company. • Imports of energy from neighboring countries are insufficient to solve the under-capacity problem; and • Apart from the Kariba Dam power station, hydropower in Zimbabwe still has a lot of potential. Solar power, wind turbine farms and biogas energy could be other possibilities for developing a Renewable energy infrastructure for Zimbabwe. *Opportunities and Barriers, Zimbabwe Country Study". United Nations Environment Programme Collaborating Centre, Risøe, Denmark. 2001. Retrieved 2010-11-17.*



Data Source: UNEP-WDPA UNEP-WCMC	
Scale: 1:3,500,000	
Projection:	Datum: WGS84
Central Meridian/Zone:	
Date: 15/09/2016	Compiled by: LOUA
Project No. 499745	Appendix: 12

srk consulting

SAPP ESMF

KEY BIOPHYSICAL, SOCIAL AND CULTURAL FEATURES OF ZIMBABWE

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Appendix C 2: Lessons Learned on Energy Projects in Africa

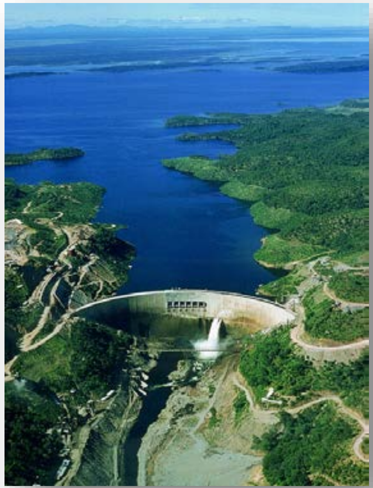
SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Note: The information contained in this table is high-level and aims to give some insights on project-induced biophysical and socio-cultural issues and impacts that have occurred in the area. It is not meant to be an exhaustive review but to serve as a reference to teams undertaking project screening.

** Projects visited during in-country missions during 2016 are italicised.

The lessons learned and best practices presented should be considered in conjunction with the overview of national baselines conditions presented in Appendix C1

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
Hydro-electric power	*Kariba Hydro-electric Scheme ** *	• Constructed between 1956 and 1959 • The scheme forms Lake Kariba which has a catchment area of 663 000 km² • Constructed on the Zambezi River along the border of Zambia and Zimbabwe (jointly owned) • The scheme supports combined installed capacity of 2010MW and comprises of a north and south bank which supplies 37% and 34% of Zambia's and Zimbabwe's power generation respectively • Zimbabwe's south bank has an installed capacity of 1050MW (circa 1960) while Zambia's north bank provides 960MW (circa 1976) • Zimbabwe opened two new 150 MW turbines in March 2018 • Rehabilitation project is underway to ensure structural integrity of the dam wall	***Biophysical:*** • The establishment of the reservoir necessitated the inundation of large areas of arable land and rangeland for cattle and wildlife (Operation Noah initiated in the late 1950s to rescue and relocate local wildlife stranded in the rising reservoir) • There was a permanent loss of woodland and savanna ecosystems and associated habitats • Eutrophication of the reservoir led to a boom in fish stocks and spread of water hyacinth • Submerged rotting vegetation gave rise to hydrogen sulphide that corroded the scheme's copperworks resulting in high maintenance costs • Negative impacts have significantly affected the downstream delta floodplain ecology. These include alteration of upstream habitat caused by increased salination and changes in water quality, reduction in the density and area of coastal mangrove ecosystems and a drop of wildlife populations in the region ***Socio-cultural:*** • Approximately 50 000 people were displaced by the project with a consequent loss of traditional land and livelihoods • Resettlement planning only commenced after construction activities had started • There was dissatisfaction amongst project affected peoples regarding the resettlement areas, compensation and government support (Zambezi River Authority continue to receive complaints to the present day) • Commercial fisheries and fish farming on the dam have become important economic activities. However, the capital-intensive methods of the commercial fisheries have reduced the supply of fish for the local population thereby affecting livelihoods

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
		 	• Wildlife sanctuaries have been created along the southern lake embankment which has promoted the growth of tourism • A tourism industry has developed around Lake Kariba (e.g. resorts, river cruises, water sports, cultural excursions and game viewing) providing employment opportunities ***Lessons learned/ best practices:*** • An assessment of environmental and social risks and impacts was not undertaken for the project. An environmental and social impact assessment (ESIA) is necessary to identify alternatives (e.g. location and design) and to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development • A proactive resettlement plan to guide physical displacement was not prepared prior to construction. A resettlement plan must be prepared during the period of feasibility studies and approved before a decision is made to commence construction • Resettlement requires detailed pre-project demographic, health and socio-economic “baseline” surveys as well as frequent stakeholder engagement • Construction and resettlement schedules should be synchronized. Synchronization requires not just physical removal to completed housing, but also provision of adequate water and sanitation facilities, social services such as schools and health facilities and initial implementation of development opportunities for raising living standards • Larger dams should be planned and implemented as multipurpose rather than as single purpose projects. In the Kariba case, the omission of an irrigation component was a serious deficiency since the downstream irrigation potential of land had already been well established • The design and location of dams and reservoirs needs to take account of the impacts associated with climate change such as flooding and droughts • Since the dam’s completion, ongoing water flow has carved a deep pit at the base of the Kariba dam wall increasing the risk of dam failure. A thorough geotechnical assessment is required to inform dam wall design and potential areas of vulnerability ***Information sources:*** • Site observations • http://www.zaraho.org.zm/hydro-electric-schemes/kariba-hes

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• 2000, Soils Incorporated (Pty) Ltd and Chalo Environmental and Sustainable Development Consultants. Kariba Dam Case Study, prepared as an input to the World Commission on Dams, Cape Town • 2015, ADBG. Kariba Dam Rehabilitation Project: Environmental and social impact assessment summary
	Cahora Bassa Hydro-electric Plant	• Situated on the Zambezi River in western Mozambique and constructed between 1969 and 1974 • Lake Cahora Bassa extends west to the Zambian border • The hydro-electric plant consists of five 415 MW generators providing a total installed capacity of 2075 MW • Cahora Bassa is the largest hydroelectric plant in southern Africa and the most efficient power generating station in Mozambique • The facility supplies power primarily to South Africa but also to Maputo, Tete and the Moatize coal mines 	***Biophysical:*** • Riparian zones and fish habitats have been fragmented which has altered the migratory patterns of fish • Downstream areas have seen significant reductions in soil fertility • The area of Zambezi Delta has significantly decreased since the construction of Cahora Bassa • A decline in silt deposition and nutrient availability towards the Zambezi Delta has increased the risk of coastal erosion as well as salt water intrusion causing soil salinization • The area of mangrove ecosystems has decreased around the coastal delta ***Socio-cultural:*** • Initially new rural settlements were formed due to migrant labour for project construction and development. This altered the power structures in the community undermining law and order, which resulted in increased crime and sexually transmitted diseases • Local communities were displaced whose homelands and farms were flooded due to the inundation of Lake Cahora Bassa • The relocated communities were displeased with the new location and were insufficiently compensated (they were provided with very basic amenities) • The inundation caused by the creation of Lake Cahora Bassa increased the supply of protein for the surrounding local communities • Access to safe drinking water for the local communities is limited as water supply points are not replenished regularly • Farming practices downstream have been forced closer to the river bed to access fertile soils and water supply. This exacerbates the risks posed by flooding, hippopotamus attacks and malaria • Coastal fisheries have experienced a major decline in prawn catch rates due to downstream habitat alteration ***Lessons learned/ best practices:*** • A comprehensive assessment of environmental and social risks and impacts was not undertaken. An ESIA is necessary to identify alternatives

<table>
<tr><th colspan="4">Lessons learned and best practices of energy projects in Africa</th></tr>
<tr><th>Type</th><th>Project</th><th>Brief Overview</th><th>Impacts/lessons learned/best practices</th></tr>
<tr><td rowspan="2"></td><td></td><td></td><td>(e.g. location and design) and to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development
• A fishery monitoring system (including a Fishery Management Plan) should be put in place to safeguard the sustainability of the ecosystem as a whole
• A resettlement plan must be prepared during the period of feasibility studies and approved before a decision is made to commence construction. This should include adequate compensation methods and frequent project affected persons engagement.
Information sources:
• 1999, Beilfuss. R. Can this river be saved? Rethinking Cahora Bassa could make a difference for dam-battered Zambezi. International Rivers
• World Bank. Cahora Bassa North Bank Hydro project. Hydropower Sustainability Assessment Protocol</td></tr>
<tr><td>Lesotho Highlands Water Project</td><td>• The Lesotho Highlands Water Project (LHWP) is a multi-phased project to provide water to the Gauteng region of South Africa and to generate hydro-electricity for Lesotho
• It is Africa’s largest water transfer scheme primarily that consists of two phases
• Phase I of the project, which was completed in 2003, involved the construction of the Katse dam, a 72 MW hydropower station (Muela hydropower station) and 82 km of tunnels through mountains
• Phase II started in 2014 and is currently underway. The second phase will increase the water transfer and hydro-electric power capacities with the addition of a new dam, a pump-storage scheme and associated advanced infrastructure (i.e. roads, camps, power lines, telecommunication system)</td><td>Biophysical:
• Environmental studies were undertaken at a late stage of the EIA process which meant that the studies did not facilitate the project planning
• The area of downstream habitats (e.g. mountain woodland vegetation) has been reduced as a result of unnaturally heavy river flows
• Noise and dust pollution as well as unnecessary land loss resulted from the impacts of infrastructure construction
Socio-cultural:
• There was inadequate stakeholder engagement with local communities (e.g. local settlements affected by the LHWP were not given the opportunity to raise their concerns about the project)
• Relocated communities regard their livelihoods as being worse than before
• There were delays with project affected persons compensation due to slow delivery of services
• There was uncontrolled and disorganized development due to a rapid population flux as people migrated to site with the intention of finding jobs
Lessons learned/ best practices:
• Environmental and social impact monitoring plans should be implemented to provide feedback for management for deciding on modifications and more efficient and effective means and achieving environmental and social objectives</td></tr>
</table>

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• It is important to include environmental studies at the early stages of the EIA process to ensure that the identified conditions, impacts and risks can facilitate the planning of the project • There was a lack of EIA capacity amongst staff of the implementing agency (i.e. Lesotho Highlands Development Authority) which resulted in a subsequent loss of project planning authorities and decision makers. All authorities involved in the project planning process must be aware of the details in the EIA process. There is therefore a need to increase the EIA capacities of implementing agencies • A thorough public participation process must be included in the RAP to avoid relocation conflict with local communities • Large multi-phased projects should include programmes for project affected persons that: o aid in sustaining their livelihoods o educate the concerned villages regarding the project's prime objectives o show how the project can benefit communities ***Information sources:*** • www.lhda.org.ls • 1997, Lesotho Highlands Development Authority. Lesotho Highlands Water Project Phase 1B: Environmental Impact Assessment • 1997, Setenane, N. An evaluation of environmental impact assessment procedure in the Lesotho Highlands Water Project: Phase 1A • 2006. On the wrong side of development: lessons learned from the Lesotho Highlands Water Project. Transformation Resource Centre • 2014, Manwa, H. Impacts of Lesotho Highlands Water Project on sustainable livelihoods. Mediterranean Journal of Social Sciences. 5

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
Photovoltaic power	*Omburu Solar Power Plant***	• Omburu Solar Power Plant is located in the Erongo region of Namibia near Omaruru • The 4.5 MW photovoltaic solar energy facility is installed on a single axis horizontal tracking system • Omburu was commissioned in 2015 and is the first photovoltaic facility in Namibia • The plant is connected to an existing substation and national grid 	***Biophysical:*** • Initial land clearance and infrastructure construction caused disturbance of flora, fauna and avifauna (e.g. habitat loss and avifauna collisions) • Degradation of soil fertility due to increased soil erosion and loss of vegetation ***Socio-cultural:*** • Primary impact on agricultural activities (grazing and farmland) due to loss of arable land (e.g. clearing of vegetation, levelling of site) • Significant visual impact as a result of the flat topography of the area ***Lessons learned/ best practices:*** • Alternatives assessment undertaken at three substation sites • An ESIA was conducted to identify alternatives (e.g. location and design) and to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development (guided by national regulatory requirements) • Visual Impact Assessment determining the potential visual impacts to surrounding activities was included • The central highlands and escarpment of the country is archaeologically dense requiring an archaeological assessment • Funding must be secured at an early stage of the project • Solar facilities generally require less maintenance than other counterpart energy facilities whereby reducing operational cost ***Information sources:*** • Site observations • 2014, Aurecon, NamPower. EIA for three 10MW photovoltaic (solar) energy facilities proposed for Mariental, Omaruru and Okahandja
	Khi Solar One	• Khi Solar One is a concentrated solar power (CSP) system located in the Northern Cape of South Africa • It is the first CSP facility in Africa which commenced operation in 2016 and covers an area of 140ha • The CSP plant has an installed capacity of 50MW to power 45 000 households on the South African grid	***Biophysical:*** • Initial site preparation activities resulted in the removal of local agricultural land (e.g. grazing and farm land) • Avifauna and bat mortality as well as the disturbance of avifauna migratory routes are the most significant risks associated with the operational phase of the project (e.g. bird collisions with the central receiver tower) • There is a risk of pollution runoff altering the sensitive indigenous aquatic ecosystems (e.g. river beds and riparian systems) from site preparation and construction activities • There is an increased risk of bush fires due to the activities related to construction ***Socio-cultural:***

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
		 	• Local communities have benefited from the project o The plant has promoted local economic development with the participation of local businesses o The plant's 20% ownership by the local community trust ensures the continuity of investment in the community • The surrounding communities sense of place is altered by the visual impact associated with the facility • Water availability for the local communities may decrease as the demand for water increases due to the requirements of the facility ***Lessons learned/ best practices:*** • An assessment of impacts for project alternatives was undertaken which comprehensively presented the various options and impacts for different project locations, designs, technologies and routings • An EIA was conducted to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development (guided by national regulatory requirements) • A monitoring plan for avifauna and bats is being implemented to assess the actual impact caused by the facility on these species and their migratory patterns from which further measures can be put in to avoid or reduce the identified negative impacts • The central highlands and escarpment of the country is archaeologically dense requiring a thorough archaeological assessment ***Information sources:*** • 2010, Savannah Environmental Pty Ltd. Environmental Impact Assessment Process. Final Environmental Impact Assessment Report: Proposed Upington Solar Thermal Plant and Associated Infrastructure, Northern Cape • 2017, Rudman. J, Gauche. P and Esler. K. Direct environmental impacts of solar power in two arid biomes: An initial investigation. South African Journal of Science. 113

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
Wind power	*Sere Wind Farm***	• Sere Wind Farm is a 100 MW wind energy facility located near Koekenaap in the Western Cape, South Africa • It commenced operation in 2015 and consists of 46 2.3 MW turbine units that feed electricity into the national grid 	***Biophysical:*** • Endemic habitat alteration due to project construction • Avian and bat mortality and the disturbance to their migration routes is a huge risk during the operational phase of the project ***Socio-cultural:*** • Noise pollution and the visual impact of the facility is significant and primarily concerns the area's local communities and towns ***Lessons Leaned/ best practices*:** • An EIA was conducted in fulfilment of national requirements including a range of specialist studies and management measures to mitigate impacts • Noise and visual impacts can be avoided or reduced by limiting the location of the wind facility in the vicinity of residential areas and roads ***Information sources:*** • Site observations • www.eskom.co.za/Whatweredoing/NewBuild/Pages/SereWindFarmProject.aspx
	Dorper Wind Farm	• Locate near Molteno in the Eastern Cape Province, South Africa • This Independent Power Producer (IPP) has been in operation since August 2014 • The wind farm consists of forty 2.5 MW wind turbines with a production output of 100MW 	***Biophysical:*** • Loss of natural vegetation and soil erosion considered a direct impact due to construction phase disturbances • The primary concern for the wind facility in terms of avifauna is the collision of birds (e.g. Cape Vulture and other soaring raptors, bustard species and crane species) with the turbines and earth wires of the power lines • Most significant impact associated with the facility is the visual impact on the natural scenic resources and rural character of this region. The high impact zone is within a 5km radius ***Socio-cultural:*** • A loss of productive agricultural land due to the establishment of the wind energy facility directly impacting farmers' livelihoods • Due to the activities relating to construction and operation there is an increased risk of bush fires which may be of concern for local farm owners ***Lessons Leaned/ best practices:*** • It is important to engage with the local grid service providers to understand the suitability of the site from a connection point of view • Effectively engage with the surrounding communities by listening rather than promoting the issues the project owner thinks are important to the community (e.g. visual and noise impacts)

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			Information sources: • www.dorperwindfarm.co.za • 2010, Savannah Environmental Pty Ltd, Mayer.J and Jodas. K. Environmental impact assessment process: final EIA report: Proposed Dorper wind energy facility on a site near Molteno, Eastern Cape Province

Gas-fired power	KivuWatt Power Plant	• KivuWatt is a two-phased methane gas-fired power plant project located in Kibuye on Lake Kivu in the Western Province of Rwanda
		• Construction for the 25MW phase one plant began in 2011 and was commissioned in 2015
		• A 750t floating gas extraction facility is located offshore on Lake Kivu while the onshore power plant operates in the outskirts of Kibuye
		• The facility is the first large commercial scale power station to extract and convert an estimated 60 billion cubic meters of methane
		• Phase 2 of the project plans to increase the total capacity to 100MW through the addition of three gas extraction facilities
		
			Biophysical:
			• The lake's ecosystem sustains fisheries which is a major economic activity in the region
			• There is a high risk of destabilising sensitive biozones through gas extraction
			• Construction and operation activities give rise to potential impacts to air, soil, waste and water, e.g.
			  o Erosion from construction activities especially during the rainy season
			  o Disposal of waste (e.g. construction waste and operations waste such as oil, sludge, filters) is a major issue
			  o Water: Impacts from surface runoff, groundwater seepage, hazardous material spills, vessel maintenance and discharge of wastewater from concrete mixing, equipment washing, dust suppression, oily water and sanitation
			  o Potential impacts to the biozone from routine discharge of wash water was highlighted in the ESIA
			Socio-cultural:
			• Kibuye is the 9th largest town in Rwanda. The population is reliant on fishing and farming around Lake Kivu. The biggest threat is to the lake's fisheries
			• Impacts on subsistence agriculture: loss of 1 ha of farming land and the economic displacement of 27 farmers
			• The project gave rise to numerous traffic impacts during construction
			• There are potential risks of gas eruptions and fire hazards due to the extraction and transport of methane
			• Compensation payment for farmers based on wages
			• RAP prepared with farmers to restore pre-displacement conditions and provide a sustainable livelihood
			• There is a lack of land in the area for resettlement
			Lessons learned/ best practices:
			• To avoid major impacts on soils and watercourses construction is to begin during the dry season

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• During the construction phase the project generated a large amount of waste requiring the preparation and implementation of a reliable local waste management plan • Layers must be maintained to prevent lethal gases escaping or contaminating the biozone • Roles and responsibilities for monitoring must be clearly defined • Intensive specialist studies should be conducted to better understand the receiving environment and identify risks and impacts and provide mitigation measures accordingly • The risks relating to the initial extraction and operational phases of gas-fired power plants need to be identified and management to ensure the safety of staff and surrounding communities ***Information sources:*** • https://www.power-technology.com/projects/kivuwatt-project-lake-kivu-kibuye/ • 2009, KivuWatt Project Environmental and Social Impact Assessment (ESIA), Sinclair Knight Merz Ltd
	*Kinyerezi Thermal Power Station***	• Kinyerezi Thermal Power Station is located in the Kinyerezi administrative ward in Dar es Salaam, Tanzania • The plant is fired by natural gas that it extracted and piped ion from sites in Mnazi Bay and Songo Sogna gas field • Kinyerezi I was fully commissioned in 2016 and has an installed capacity of 150MW • Construction on Kinyerezi II started in 2016 and was commissioned in April 2018. And operates with an installed capacity of 168 MW • The current total capacity is 318 MW while expansions on both plants are underway	***Biophysical:*** • Loss of vegetation due to initial clearance of land • Soil erosion was experienced particularly at coastal sites where transport of fuel and construction took place ***Socio-cultural:*** • An increase in air pollution particularly nitrogen dioxide was experienced in the area • The facility poses a number of safety risks to workers and communities due to potential fires and explosions • There is encroachment of surrounding communities towards the facility's boundary fence (signs of new houses being built) ***Lessons learned/ best practices:*** • An alternatives analysis (e.g. location, design, technology and routing) is required at the early stages of project planning to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• A lack of funding for the maintenance of the gas engines resulted in a long lead time to purchase the necessary parts which halted operation and ensued major costs. To avoid delays in operation, the required funding must be allocated at an early stage of the project • There is a need for active engagement with key stakeholders (e.g. city planners and local communities) to prevent encroachment towards the facility • Site screening and an alternatives assessment is important in siting of the facilities that require a buffer zone • There was a need to improve the education standard of power plant staff. The education plan and training programs for operation should be improved and looked at to include knowledge of the system as a whole • A lesser efficient gas plant was chosen (e.g. Kinyerezi I simple cycle instead of a combined cycle) because of deadline prioritization and budgetary deficits. A thorough cost comparative analysis of plant technologies is advised to ensure that the least costly path is chosen • Site screening is a crucial step for thermal gas stations as considerations such as access to water and gas are important for operation. These considerations must be looked at thoroughly during the selection of sites to improve efficiency and ultimately reduce costs ***Information sources:*** • Site observations • 2016, Data Collection Survey on Gas Thermal Power Generation in United Republic of Tanzania, TANESCO
Geothermal power	Olkaria Geothermal Project	• Located in the Hell's Gate National Park in Olkaria on the eastern edge of the Eastern Rift Valley in Kenya • Olkaria I was the first geothermal power plant in Africa and was commissioned in 1981 with a capacity of 185 MW. Olkaria II is Africa's largest geothermal power station generating 105 MW while plants III and IV have capacities of 139 MW and 140 MW respectively. The Olkaria complex has a total installed capacity of 569 MW	***Biophysical:*** • Erosion of protected national park land due to the construction and operation of drilling pads, roads and power stations • Hazardous chemicals in wastewater of the wells' discharge. Potential ecotoxicological hazard due to trace elements present • Hydrogen sulphide health implications in ambient air quality • Loss of migratory corridors and habitat from vegetation clearing. Disturbance on indigenous vegetation, fauna and avifauna ***Social-cultural:*** • Loss of land in the area- much of which belonged to individuals and institutions • Resettlement of traditional Maasai community • Economic displacement. Communities relying on the area for economic opportunities ***Lesson learned/ best practices:***

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• A strategic environmental assessment (SEA) was only undertaken for the expansion of the Olkaria complex. An SEA should be included prior to any regional project development to assess strategic options, opportunities and risks relating to the project's alternatives to identify critical decision factors • It is important to secure funding for the first project phases as confirming an appropriate geothermal resource needs time and requires in depth exploration studies (e.g. drilling and testing) • Negotiations about further development caused delays after the geothermal wells were explored. These wells could have been advantageously used to run pilot plants to generate power while decisions were being made. Staged development is key to making early use of the existing wells which reduces early expenditure and produces revenue to push the project forward and build confidence in the resource and abilities of the country to implement geothermal projects • Transmission line routes were changed several times because of newly surfaced environmental concerns. To avoid these delays and unnecessary cost, a comprehensive EIA of the project must be included that considers the whole project picture and wider region of influence. The environmental impacts must be carefully identified, mitigated and continually monitored ***Information sources:*** • 2016, Barasa.P, KenGen. Strategic Environmental Assessment (SEA) for Energy Sector: Case study of Olkaria Geothermal Expansion Programme in Nakuru County, Kenya • 2007, Mwangi, M, Olkaria Geothermal Project. Environmental management in geothermal development: case study from Kenya
Coal-fired power	Medupi Power Station	• Medupi is a dry-cooled coal-fired power station situated near Lephalale in Limpopo, South Africa • Three turbine units are currently in operation. Unit 6 was the first to be commissioned in 2015 while units 4 and 5 became operational in 2017. Each unit supplies 800 MW to South Africa's national grid	***Biophysical:*** • Destruction of natural habitat and protected flora species from initial construction activities • Increase contribution to global warming and energy sectors emissions • Emissions from the facility impact air quality • Sulphur dioxide predicted to exceed these national and international air quality limits • There are impacts on surrounding habitat and local settlements ***Socio-cultural:*** • Effects on tourism in the area. Local reserves and game and wildlife viewing may be affected through land loss and ecosystem changes • Primary impact on agricultural/farming practices due to loss of arable land

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
		 	• Local communities benefited from the project. The average household income has increased in Lephalale the community surrounding the Medupi power station due to services and labour provisions ***Lessons learned/ best practices:*** • Conducted a full EIA in fulfilment of national requirements including a range of specialist studies and management measures to mitigate impacts • Large-scale projects require regular stakeholder engagements to identify any possible issues or problems that may arise during construction or operation • To avoid and manage labour instability at the sites effective management and labour relations are required. This minimizes or eliminates delays in the project during construction • Air quality is a key issue on the Medupi project exacerbated by the design on the back filters which will need to be changed at major cost. Preferred technological alternatives need to be evaluated and decided upon and suppliers' technical specifications stringently applied in accordingly ***Information sources:*** • www.eskom.co.za/Whatweredoing/NewBuild/MedupiPowerStation/Pages/Medupi_Power_Station_Project.aspx • 2006, Bohlweki Environmental (Pty) Ltd. Environmental Impact Assessment Report for the Proposed Establishment of a New Coal-Fired Power Station in the Lephalale Area, Limpopo Province, Eskom Generation
Nuclear power	*Koeberg Nuclear Power Station***	• Koeberg Nuclear Power Station is situated 30 km north of Cape Town in the Western Cape of South Africa • The nuclear power station started construction in 1976 and had Unit 1 synchronized to the South African grid in 1984. Unit 2 was commissioned in 1985 • Each unit has a capacity of 970MW with a total installed capacity of 1940MW • Koeberg is the only nuclear power station in Africa and has been in operation for over 28 years	***Biophysical:*** • The use of sea water for plant cooling has reduced plankton abundance and altered the local marine ecosystem • The sensitive dune ecosystem surrounding the nuclear plant may be altered due to the construction of a marine harbour ***Socio-cultural:*** • There are intergenerational challenges with regards to the management of stored radioactive waste due to its long decay time • Security concerns have limited urban development in the region • Safety at the facility is emphasized due to the serious risks of fire hazards, explosions and radiation leakage • Low and medium level waste from Koeberg is dumped at Vaalputs. The residents here were displeased as they not consulted when this dump site was selected ***Lessons learned/ best practices:***

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Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• A marine management plan is required because of direct marine impacts linked to the stations construction and long-term operation • Due to the high risks and impacts associated with nuclear waste, a comprehensive waste management plan must be implemented to ensure the sustainable storage of radioactive waste • A strong disaster management plan must be created because of the large explosive and radioactive risks and the associated urban areas that surround Koeberg (e.g. Cape Town) ***Information sources:*** • Site observations • www.eskom.co.za/Whatweredoing/ElectricityGeneration/KoebergNuclearPowerStation/Pages/Koeberg_Power_Station.aspx • 1991, J.Hugget and P.Cook. The effects of entrainment on plankton at Koeberg nuclear power station, South African Journal of Marine Science,11:211-226
Transmission	*DRC Electricity Access and Services Expansion (EASE)***	• The project primarily aims to expand access to electricity in the urban and rural areas of the DRC with a sub-component to support sector planning, capacity development and investment preparation for future electricity developments • The project entails the rehabilitation and expansion of the Kinshasa network, the SNEL-owned independent grid system and will support active private sector developers outside Kinshasa • The sub-stations and their associated transmission lines to be upgrade are located in Lingwala, Liminga and Kimwenza, on the outskirts of Kinshasa • There are 3 outgoing and 3 incoming high voltage transmission lines	***Biophysical:*** • The transmission lines traverse rural areas where farming takes place • Natural vegetation has to be cleared removing resources (e.g. wood) used by local communities • New electricity services will replace the consumption of fossil fuels (e.g. kerosene and wood) • Expected changes in precipitation due to climate change may result in increased frequency and intensity of floods and droughts which may damage or reduce the effectiveness of grid distribution and off grid infrastructure ***Socio-cultural:*** • Current settlements affected by transmission line construction • Communities continue to use the land in the servitudes posing health and safety risks and issues • There are challenges associated with the relocation of people working and or living within the designated servitude. City planning issues • Structures located in very close proximity to transmission lines • Wider electricity provisions will allow for more productive activities which will improve the livelihoods of communities, especially in rural areas ***Lessons learned/best practices*:** • An alternatives assessment is needed to determine the least impactful routing of transmission lines

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
			• It is important to engage broadly with all stakeholders who have a strong interest in the projects development. These include government, private sector, development partners, financiers and consumers • Work with city planners is essential to ensure that mechanisms are put in place to restrict encroachment on the servitudes and infrastructure • Substantive stakeholder engagement is essential to raise awareness among affected parties regarding the safety risks of working and living in close proximity to transmission lines and facilities • There are challenges associated with project implementation as a result of the low institutional capacity of SNEL. To mitigate this, capacity building will be required (i.e. use of in-house advisors, training, sharing of best practices knowledge and implementation support) ***Information sources:*** • Site observations • 2017, World Bank. Project appraisal document on a proposed grant and a proposed credit to the DRC for an electricity access and services expansion project
	Mozambique Backbone Transmission System(CESUL)	• CESUL is a 1400km double transmission line (800kV DC and 400kV AC) running from the Tete Province in central Mozambique to the capital Maputo in the south and the SAPP interconnected power network • The transmission system will transport electricity generated in the new hydro power plants from Mphanda Nkuwa and Cahora Bassa	***Biophysical:*** • Initial bush clearance and alteration of terrestrial and aquatic habitat due to the construction of a new transmission line corridor • The corridor will cross through a conservation area (i.e. Gorongosa National Park). Alteration of the already sensitive savannah and forest ecosystems is a risk that needs to be closely monitored • It has been identified that certain sections of the line route may result in bird strikes (e.g. river crossings and routing between national parks) ***Socio-cultural:*** • Temporary improvement in health and nutrition of local workers' families related to salaries • Increased local economy due to an increase in demand for locally produced food and services as well as increased cash circulation in the community • Increased pressure to the access of local water, fuel and food resources as a result of temporary camps located close to local communities especially in the dry season

SAPP ESMF Appendix C2 – Lessons Learned on Energy Projects in Africa

Lessons learned and best practices of energy projects in Africa			
Type	**Project**	**Brief Overview**	**Impacts/lessons learned/best practices**
		 	• Social conflict may arise from the unbalanced spending power between those that are employed by the project and those that are not • Permanent economic displacement of farming activities and physical displacement of homes ***Lesson learned/ best practices:*** • An alternatives analysis (e.g. location, design, technology and routing) is required at the early stages of project planning to prevent, reduce or mitigate the impacts that arise on the biophysical and socio-cultural environment during all phases of development • Appropriate local resettlement planning, compensation and livelihood restoration measures should be implemented effectively as the project's sphere of influence is large and so affects a greater portion of owned land and communities • Safety risks associated with unexploded ordinances (UXOs). Contractors will not work in project areas until UXOs have been cleared. This issue needs to be identified at the earliest stage of project development (screening and scoping) • A strategic environmental assessment was undertaken to assess strategic options, opportunities and risks relating to the project's alternatives to identify critical decision factors (e.g. including hydroelectric power for transmission instead of coal) ***Information sources:*** • 2011, Electricidade de Mocambique. Mozambique Regional Transmission Backbone Project, Non-Technical Summary for Draft ESIA. • 2012, SNC-Lavalin International, GMSC. Strategic Regional Environmental and Social Assessment (SRESA) - Mozambique Regional Transmission Development Project (CESUL)

Appendix D: National and International Safeguard Requirements

SAPP ESMF Appendix D – National and International Safeguard Requirements

Table 1: Overview of national legislation

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
Angola		
• Ministry of Environment; and • National Directorate for Prevention and Environmental Impact Assessment	• Constitution of the Republic of Angola, 1992; • Environment Framework Law, No.5/8 of June 1998; • Decree on Environmental Impact Assessment No.51/2004 of 23 July 2004; and • Decree on Environmental Permitting No.59/07 of 14 October 2007.	<u>Policies and Strategies</u> • Angola 2025: Long-Term Strategy; • Strategy to Combat Poverty, 2003; and • National Biodiversity Strategy and Action Plan, 2006. <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • Fisheries Act, No. 20 of 1992; • Biological and Aquatic Resources Act, No 6-A of 2004; • Decree on Soil, Flora and Fauna Protection, No. 40 of 1955; • Mining Act, No. 5 of 1979; • Land Use Planning and Urban Development Act, No. 3 of 2004; • Land Law, No. 9 of 2004; • Water Law, No. 6 of 2002; • Law on internal waters, ocean and exclusive economic zone, No. 21 of 1992; • Decree on Environmental Protection for Petroleum Activities, No. 39 of 2000; and • Local Municipalities Act, No. 17 of 1999.
Botswana		
• Ministry of Environment Wildlife and Tourism; and • Department of Environmental Affairs.	• Constitution for Environmental Protection in Botswana, 2016; • Environmental Impact Assessment Act, No. 6 of 2005; • Environmental Assessment Act, No.10 of 2010 (Still to be passed into law); and • EIA Regulation in draft.	<u>Policies and Strategies</u> • Botswana National Water Master Plan, 1992 (currently being revised); • Poverty Eradication Guidelines, 2012; • Community Based Natural Resources Management Policy (forthcoming); • National Ecotourism Strategy (forthcoming); • Energy Policy and Master Plan; and • Mining Policy. <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • Water Act of 1968 (Act to be revised); • Waterworks Act of 1962; • Aquatic Weeds (Control) Act, No. 46 of 1971; • Atmospheric Pollution (Prevention) Act, No. 2 of 1971; • Waste Management Act, No. 12 of 1998; • Forest Act, No. 13 of 1976; • Wildlife Conservation and National Parks Act, No. 28 of 1992 (as amended in 2002); • Wildlife Conservation and Game Reserves Regulations of 2001; • Fish Protection Act, No. 42 of 1975;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
		• Tourism Act, No. 22 of 1992; • Tourism Regulations of 1996; • Public Health Act, No. 44 of 1971; • Public Health Bill 23 of 2012 (out for comment); • Tribal Land (Amendment) Act, No. 14 of 1993; • State Land Act, No. 29 of 1966; • Land Control Act, No. 2 of 1975; • Agricultural Resources Conservation Act 1974; and • National Monuments and Relics Act, No.12 of 2001.
DRC		
• Ministry of Environment, Nature Conversation and Sustainable Development; and • Group for Environmental Studies of Congo.	• Constitution for Environmental Protection in DRC, 2006; and • Environmental Protection Act, No.11/009 of 2011.	<u>Policies or Strategies</u> • Poverty Reduction Strategy Paper No.10 of October 2010; and • Country Strategy Paper and National Indicative Programme, 2008-2013 (DRC). <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • National Environmental Action Plan Decree, No. 002 of 1997; • Fundamental Principles of the Agriculture Sector Law in 2011; • Environmental Protection Act, No.11/009 of 2011; • Water Resources Ordinance, No.52-443 of 1952; • Water Supply Ordinance, No. 81/23 of 1981; • Draft Framework Law on the Environment: Ordinance, No. 52-443 of 1952; • Regulation on Lake and Watercourse Contamination and Pollution, 1914; • Mining Code: Law No 007 of 2002; • Mining Regulations. Decree, No. 038 of 2003; • Mining Regulations Decree, No.038 of 2003; • Forest Code, Law No.011 of 2002; and • Oil Exploitation Code Decree Act of 2008.

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
Lesotho		
• Ministry of Tourism, Environment and Culture; • Department of Environment; and • The National Environmental Secretariat.	• Constitutional Requirement for Environmental Protection in Lesotho; and • Environment Act, No.10 of 2008.	<u>Policies and Strategies</u> • Poverty Reduction Strategy for 2004/2005 and 2006/2007; • Country Strategy Paper and National Indicative Programme, 2008-2013 (Lesotho); • National AIDS Policy & Strategy Plan for 2006–2011; • Energy Policy 2012; and • Transmission Grid. <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • Water Resources Act, No. 2 of 1978; • Water Resources Regulations, 1980; • Environment Act, No. 15 of 2001; • Public Health Order, No. 12 of 1970; • Town and Country Planning Act, No. 11 of 1980; • Protection of Fresh Water Fish Proclamation, No. 45 of 1951; • Fresh Water Fish Regulations, No. 112 of 1951; • Lesotho Highlands Development Order, 23 of 1986; • Forest Act, No 11 of 1978; • Forest Regulation LN 36 of 1980; • Mines and Minerals Act, 1966; • Mine Safety Act, 4 of 1981; • The Mining Regulations, Decree No.038/2003 of 26 March 2003, contain environmental considerations Mining Rights Act, 43 of 1967; • Land Husbandry Act, 22 of 1969; • Land Act, No 17 of 1979; • Land Regulations LN 15 of 1980; • Roads Act, No 24 of 1969; • Environment Act, 15 of 2001 (transmission); • National Parks Act, 11 of 1975; • Historical Monuments, Relics, Fauna and Flora Act, No 41 of 1967; • Environment Act, 15 of 2001 (cultural); • Industrial Licensing Act, 27 of 1969; • Sanitary Services and Refuse Removal Regulations, LN 36 of 1972; • Urban Government Act, 3 of 1983; and • Lesotho Housing and Land Development Corporation Order, 12 of 1988.

SAPP ESMF Appendix D – National and International Safeguard Requirements

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
Malawi		
• Ministry of Natural Resources, Energy and Environment (MNREE); and • Environmental Affairs Department (EAD).	• The Constitution of Malawi (Republic of Malawi 1994; as amended); and • National Environmental Management Act, No.23 of 1996.	Policies and Strategies • National Environmental Policy 1996; • National Forestry Policy 1996; and • Poverty Reduction Strategy, 2012. Acts, Decrees, Orders, Regulations, Ordinances • Water Resources Act CAP 72.03 (1969); • Water Works Act, CAP 72.01 (1995); • Water Resources Management Policy and Strategies (1994) (1999 draft in prep); • Water Resources (Water Pollution Control) Regulations Part VIII of EMA, s.42 relates to the prevention of pollution; • Forestry Act, CAP 63.01 (1997); • Mines and Minerals Act, CAP 61.01) and Regulations; • Explosives Act, CAP 14.09 and regulations; • Petroleum (Applications) Regulations, CAP 61.01; • National Parks and Wildlife Act, CAP 66.07 (1992), as amended and Regulations; • Plant Protection Act, CAP 64.01; • Land Act, CAP 57.01 (1965); • Customary Land (Development) Act, CAP 59.01 (1967); • Registered Land Act, CAP 58.01 (1967); • National Lands Policy (2002); • Fisheries Conservation and Management Act, CAP 66.05 (1997); • Regulations (2002) National Fisheries and Aquaculture Policy, 2001; • Industrial Development Act, CAP 51.01; • Electricity Act, CAP 73.01; • Public Roads Act, CAP 69.02; • Public Health Act, CAP 34.01; and • Monuments Act, CAP 29.01.
Mozambique		
• Ministry of Land, Environment and Rural Development (MITADER) • National EIA Directorate.	• The Constitution of the Republic of Mozambique (2004); • Environmental Law, No.20/97 of 1 October 1997; • National Environmental Management Programme, 1995; • Regulations on the Environmental Impact Assessment Process, Decree No.45 of 2004; and	Policies and Strategies • National Water Policy, 1995, amended in October 2007. 1990 Constitution Act; • Water Law (Law 16/91); • Poverty Reduction Strategy, 2011; • Southern African Development Community (SADC) Protocol on Shared National Water Resource Management Strategy,2007; • Dec 18/2004, New Regulations on Environmental Quality and Effluent Discharge Decree No. 24/2008, Regulations on the Management of Substances that Deplete the Ozone Layer;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
	• There are new Mozambique EIA Regulations, these Regulations came into effect early this year (2016). The new Regulations now define 4 project categories (A+, A, B & C). The previous Regulations defined categories A, B & C.	• Legislative Diploma 48/73 General Regulations on Hygiene and Safety on Industrial Plant; • Legislative Diploma No. 48/73, General Regulations on Hygiene and Safety on Industrial Plant; and • Conservation Policy and Implementation Strategy, 2009 Regulation for Control of Alien Invasive Species, 2008. Acts, Decrees, Orders, Regulations, Ordinances • Forestry and Wildlife Law, No. 10 of 1999; • Municipality Law No 2/97; • Land Law, No. 19 of 1997, and Regulations (Law 66/98); • Petroleum Law No. 3 of 2001; • Petroleum Operations Regulations No. 24 of 2004; • Decree 26 of 2004 provides Environmental Regulation for Mining activities; • Land Law, No. 19 of 1997 and regulations (Law 66/98); • Decree No 12/2002 regulation for Flora and Fauna Resources Protection; • Electricity Law No.21 of 1997; • National Heritage Protection Law (Law 10/88 of 22 December 1988); • Decree No 27/94 are Regulations on the Protection of archaeological Heritage Property; • Strategy on Renewable Energy, Electricity Law, Energy Concessions Decree (8/2000) and Law (8/1997), Regulation of Electrical Installations (48/2007); and • Energy Sector Company Licensing and compliance certificate requirements (51/2013).
Namibia		
• Ministry of Environment and Tourism (MET); and • Department of Environmental Affairs (DEA).	• Constitutional requirements for environmental protection in Namibia, 1994; • Environmental Management Act, No.7 of 2007; and • Regulations in draft.	Policies and Strategies • Namibia Country Strategy Paper 2014-2018; and • National Poverty Reduction Strategy, 1998. Acts, Decrees, Orders, Regulations, Ordinances • Water Resources Management Act, No. 24 of 2004; • Atmospheric Pollution Prevention Ordinance, No. 11 of 1976; • Pollution Control and Waste Management Bill (in preparation); • Public Health Act No. 36 of 1919, with subsequent amendments; • Minerals (Prospecting and Mining) Act, 2003; • Petroleum (Exploration and Production) Act, No. 2 of 1991, as amended; • Prevention and Combating of Pollution of the Sea by Oil Act, 1981, and the Amendment Act, No. 24 of 1991; • Namibian Ports Authority Act, No. 2 of 1994; • Nature Conservation Ordnance, 1975; • Forestry Amendment Act, No. 13 of 2005;

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Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
		• Agricultural (Commercial) Land Reform Act, 1995; • Communal Land Reform Act, 2002; • Marine Resources Act, No 27 of 2000; • Inland Fisheries Resources Act, No. 1 of 2003; • Aquaculture Act, No. 18 of 2002; • National Monuments Act, No. 28 of 1969; • National Heritage Act, No. 27 of 2004; • Regional Councils Act, No. 22 of 1992, amended in Act No. 24 of 2000; and • Local Authorities Act, No. 23 of 1992.
South Africa		
• Department of Environmental Affairs (DEA); and • National DEA or provincial departments.	• Constitutional requirements for environmental protection in South Africa, 1994; and • National Environmental Management Act, No.107 of 1998 as amended December 2014 Regulation 982 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA).	<u>Policies and Strategies</u> • Green Paper on an Environmental Policy for South Africa, October 1996; • White Paper on Environmental Management Policy, July 1997; • National Strategy for Sustainable Development and Action Plan 2011- 2014; and • South Africa's Key economic policies changes since 1994-2013. <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • National Water Act, No. 36 of 1998, as amended from September 2014; • Mountain Catchment Areas Act, No. 63 of 197D; • National Water Act Regulations, No. 704 of 1999; • South African Water Quality Guidelines; • National Environmental Management: Waste Act, No. 59 of 2808 as amended by Act 14 of 2013; • Hazardous Substances Act, No. 15 of 1973, and associated Regulations; • Regulation 69 in terms of the MPRDA, No. 28 of 2002, and the Mine Health and Safety Act, No. 29 of 1996; • White Paper on Energy Policy, No.19606, dated 17/12/98, and White Paper on Renewable Energy, No.26169, dated 14/05/04; • Draft National Energy Bill of 2004; • Development Facilitation Act, No.67 of 1995; • National Forests Act. No.84 of 1998; • MPRDA, No. 28 of 2002, and Regulations R527 of 23/04/04; • MPRDA, No.28 of 2002, Regulations R527 of 23/04/04, and the Mine Health; • Safety Act, No. 29 of 1996; • National Environmental Management: Biodiversity Act, No.10 of 2004, as amended February 2014; • National Parks Act, No. 57 of 1956; • National Environmental Management: Protected Area Act, No. 57 of 2003, and Regulations on the management of protected areas and World Heritage Sites;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
		• Several Acts, including the Conservation of Agricultural Resources Act, No. 43 of 1983, and Regulations, as amended; • Restitution of Land Rights Act, No.22 of 1994; and • National Heritage Resources Act, No. 25 of 1999.
Swaziland		
• Ministry of Tourism and Environmental Affairs (MTEA); and • Swaziland Environmental Authority (SEA).	• Environmental Management Act, No.20 of 2004; and • Environmental Audit, assessment and Review Regulations of 1996, as amended in 2000.	Policies and Strategies • The Swaziland Poverty Reduction Strategy and Action Plan, June 2007; • Swaziland Country Strategy Paper 2014-2018; • Forest Policy, 2002; • Draft Land Policy, 1999; • Swaziland Environment Action Plan; • Biodiversity Strategy and Action Plan; • State of the Environment Report 2012; • Climate Change policy and Strategy; • Strategic Environmental and Social Assessment (SESA): Renewable Energy and Independent Power Prouder Policy in Swaziland, 2014; • Third National Communication to UNFCCC; and • National Energy Policy, 2003. Acts, Decrees, Orders, Regulations, Ordinances • Water Act, No. 7 of 2003; • Air Pollution Control Regulations, 2010; • Water Pollution Control Regulations, 2010 (replace the Purification of Industry Water and Effluent Regulations, No. 25 of 1967); • Waste Regulations, 2000; • Electricity Act, No. 10 of 1963; • Public Health Act, No. 5 of 1969; • Town Planning Act, No. 45 of 1961; • Urban Government Act, No. 8 of 1969; • Flora Protection Act, No. 10 of 2000; • Forest Preservation Act, No. 14 of 1910; • Control of Tree Planting Act, No. 7 of 1972; • Mining Act, No. 5 of 1958; • Explosives Act, No. 4 of 1961; • Swaziland National Trust Commission Act, 1972, and Regulations; • Protected Places and Areas Act, No. 13 of 1966; • Wild Birds Protection Act, No. 45 of 1914; • Ozone Depleting Substances Regulations, 2003; • Occupational Health and Safety Act, 200;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
		• Natural Resources Act, No. 71 of 1951; • Plant Control Act, No. 8 of 1981; • Grass Fires Act, No. 44 of 1955; • Protection of Freshwater Fish Act and Regulations, 1937; and • Roads Traffic Act No.6 of 2007.
Tanzania		
• Ministry of Environment (MoE); and • National Environmental Management Council (NEMC).	• Environmental Management Act, No.20 of 2004 (currently under review); • Environmental Impact Assessment and Audit Regulations, Government Notice No.349 of November 2005; and • National Environmental Policy, 1997.	Policies and Strategies • National Strategy for Growth and Reduction of Poverty (NSGRP I) in 2005; • Agricultural Sector Development Strategy, 2001; • Tanzanian National Environmental Policy, 1997 (under review); • National Environmental Action Plan, 2006; and • Forestry Policy, 1993. Acts, Decrees, Orders, Regulations, Ordinances • The Marine Parks and Reserves Act, No. 27 of 1994, (includes provisions for Environmental Impact Assessment (EIA); • National Fisheries Sector Policy and Strategy Statement, 1997; • Fisheries Act, No. 22 of 2003; • Management Plan for the Mangrove Ecosystem in Tanzania, 1991; • Wildlife Conservation Act, No. 12 of 1974, as amended; • Natural Resources Ordinance; • The Fisheries Legislation (Revised 1988); • National Land Use Planning Commission Act, No 3 of 1984; • Land Act, No 4 of 1999; • Village Land Act, No 5 of 1999; • Regional Administration Act, 1997; • Local (District and Urban) Authorities Act, No. 7 of 1982; • The Public Land Decree; • Forest Act, No 14 of 2002; • Plant Protection Act, No 13 of 1997; • National Parks Ordinance Water Utilisation (Control & Regulation) Act, No. 42 of 1974 as amended in 1981 and 1997; • Urban Water Supply Act, No 7 of 1981; • The Forest Reserve Decree; • The Commission of Lands and Environment Act, 1988; • Mining Act, No 5 of 1998 and Regulations of 1999; • Explosive Act, No 56 of 1963; • The National Energy Policy of 2003; • The Rural Energy Act, 2005;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
		• The Electricity Act, 2008; and • The Petroleum Act, 2015.
Zambia		
• The Environmental Council of Zambia; and • Zambian Environmental Management Agency (ZEMA).	Constitutional Requirement for Environmental Protection in Zambia, 1996; Environmental Management Act, No.12 of 2011; and Environmental Protection and Pollution Control (Environmental Impact Assessment) Regulations, Statutory Instrument No.28 of 1997).	<u>Policies and Strategies</u> • National Water Policy, 1994; • Poverty Reduction Strategy, 2005; and • National Development Plan 2013-2016. <u>Acts, Decrees, Orders, Regulations, Ordinances</u> • The Water Pollution Control (Effluent and Waste Water) Regulations, 1993; • National Council for Construction Act 13 of 2003; • Zambian Grid Code; • Local Government Act (CAP 22 of 1991); • International Convections and Protocols (e.g. RAMSAR, Convention on Biological Diversity); • The Water Act, Cap 312, 1948; • Water Supply and Sanitation Act, No 28 of 1997; • Air Pollution Control (Licensing and Emission Standards) Regulations, 1996 • Waste Management (Transporters of Wastes/ Operation of Waste Disposal Sites) Regulations, 1993, made in terms of Part VI of EPPCA, 1990; • Hazardous Waste Management Regulations, 2001, made in terms of Part VI of EPPCA, 1990; • Energy Regulation Act, Cap 436, 1995; • National Energy Policy, 1995; • Town and Country Planning Act, 1962, as amended; • Forest Act No.7, 1999; • Mines and Minerals Act, No. 31 of 1995; • National Policy on Wetlands Conservation, September 2001; • Zambia Wildlife Act, No. 12 of 1998; • Lands Act 20 of1996; • The Electricity Act, No. 15 of 1995; • Tourism Act, No. 29 of 1985; • National Heritage and Conservation Act, 1989; and • Zambezi River Authority Act, No. 17 of 1987.
Zimbabwe		
• Ministry of Environment and Natural Resources Management (MENRM); and	• Constitutional requirements for environmental protection in Zimbabwe, 2000;	<u>Policies and Strategies</u> • EIA Policy, August 1997; • Zimbabwe United Nations Development Assistance Framework (ZUNDAF), 1997;

Responsible ministries, departments and/or agencies	Name of constitution, environmental laws and EIA regulations	Key sectoral policies and laws dealing with environmental and social management
• Environmental Management Agency (EMA).	• Environmental management Act, Chapter 20:27 of 2007; and • Environmental Management (EIA's and Ecosystems Protection) Regulations, Statutory Instrument No.7 of 2007.	• National Environmental Policy and Strategies, 2009; and • Poverty Reduction Strategy, 2008. Acts, Decrees, Orders, Regulations, Ordinances • Water Act 20 of 2003; • Forest Act 19 of 1949 (as at 1 January 2016); • Natural Resources Act 20 of 1996; • Parks and Wildlife Conservation No 20 of Act,1975; • Communal Land and Forest Produce Act, No 19 of 1988; • Rural District Councils Act, 1989; and • Mines and Minerals Act 1961.

Source: Adapted from the SADC Environmental Legislation Handbook, 2012

Table 2: Overview of financial institutions specific policies, standards and guidelines

Financial Institutional	General Environmental & Social Management	Specific Operating Policies, Frameworks, Guidelines & Standards on Environmental and Social Issues	Monitoring and Evaluation on Environmental and Social Issues
World Bank	• Environmental assessment OP 4.01 (1999) • The World Bank Environmental, Health and Safety Guidelines are applicable (EHSG) (general and industry specific) • The Environmental and Social Framework (ESF) was approved in August 2016 and will become effective in late 2018 replacing the current World Bank Safeguard policies	Environmental and social safeguard policies: • Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects OP 4.00 (2013) • Natural Habitats OP 4.04 (2013) • Pest management OP 4.09 (1998) • Indigenous peoples OP 4.10 (2013) • Physical cultural resources OP 4.11 (2013) • Involuntary resettlement OP 4.12 (2013) • Forests OP 4.36 (2013) • Safety of dams OP 4.37 (2013) Other relevant policies: • International waterways OP 7.50 (1998) • Projects in disputed areas OP 7.60 (2012)	• Impact evaluation toolkit (2006) • Impact Evaluation in Practice (2011) • Monitoring and Evaluation: Some tools, methods and approaches
African Development Bank	• **Operational Safeguard 1:** Environmental and social assessment (2013) • Environmental and social assessment procedures for public sector (2001) • Integrated Environmental and Social Impact Assessment Guidelines (2003) • Environmental review procedures for private section operations (2003)	• **Operational Safeguard 2:** Involuntary resettlement land acquisition, population (2013) displacement and compensation • **Operational Safeguard 3:** Biodiversity and ecosystem services (2013) • **Operational Safeguard 4:** Pollution prevention and control, hazardous materials and resource efficiency (2013) • **Operational Safeguard 5:** Labour conditions, health and safety (2013) • Climate finance tracking guidance manual - energy sector (2013) • Information note on the checklist for mainstreaming gender and climate change project (2010) • Consultation and communication plan for the design of integrated safeguards system (2012) • Policy for integrated water resources management (2000) • Framework and guidelines on land policy in Africa (2010) • Policy on poverty reduction (2004)	• Integrated Safeguards Policy Statement (2013)

SAPP ESMF Appendix D – National and International Safeguard Requirements

Financial Institutional	General Environmental & Social Management	Specific Operating Policies, Frameworks, Guidelines & Standards on Environmental and Social Issues	Monitoring and Evaluation on Environmental and Social Issues
European Investment Bank	• Environmental and social safeguard policies (2007) • Declaration on the European principles for the environment (2006) • Development impact assessment framework (2004) • Environmental statement (2004) • Strategic environmental assessment directive (2006) • EIB statement of environmental and social principles and standards (2009)	• The EIB and its contribution to sustainable development (2002) • EU habitats directive (2000) • EU water framework directive (2000) • EU waste framework directive (2006) • Operations Evaluation (EV) Terms of Reference (2009) • EU large combustion plant directive (2001) • EU integrated pollution prevention and control directive (2008) • World commission on dams (2000) • UN Convention on climate change (1994) • Kyoto protocol (1997) • Århus Convention (2001) • EIB and Energy: Delivering Growth, Security and Sustainability - EIB's Screening and Assessment Criteria for Energy Projects (2013) • The EIB: Climate in everything we do (2015)	• Transaction management and restricting directorate (2016) • Project directive (2016) • Ex post evaluations (2016) • Operations Evaluation Activity Report 2014-2015 and Work programme 2016 • Evaluation at the EIB (2015) • EIB project cycle (2001)
International Finance Cooperation	• IFC performance standards on environmental and social sustainability (2012) • **Performance Standard 1:** Assessment and management of environmental and social risks and impacts (2012) • Environmental and Social Review Procedure (2007) • IFC project cycle • IFC Environmental and Social Review Procedure Manual (2013)	• **Performance standard 2:** Labour and working conditions (2012) • **Performance standard 3**: Resource efficiency and pollution prevention (2012) • **Performance standard 4:** Community health, safety and security (2012) • **Performance standard 5:** land acquisition and involuntary resettlement (2012) • **Performance standard 6:** Biodiversity conversation and sustainable management of natural resources (2012) • **Performance standard 7:** Indigenous Peoples (2012) • **Performance Standard 8:** Cultural Heritage (2012) **For each performance standard the* *IFC has relevant guidance notes (2012) on the IFC website* • The Disclosure Policy (1998) • **Guidance Note A:** Checklist of Potential Issues for an Environmental Assessment (2012) • **Guidance Note B:** Content of an Environmental Impact Assessment Report (2012)	• Environmental and social sustainability (2012) • IFC's Monitoring and Evaluation (M&E) of Advisory Services (2006)

Financial Institutional	General Environmental & Social Management	Specific Operating Policies, Frameworks, Guidelines & Standards on Environmental and Social Issues	Monitoring and Evaluation on Environmental and Social Issues
		• **Guidance Note C:** Outline of an Environmental Action Plan (2012) • **Guidance Note D:** Outline of a Project Specific Environmental Audit (2012) • **Guidance Note E:** Outline of a Project Specific Major Hazard Assessment (2012) • **Guidance Note F:** Guidance for Preparation of a Public Consultation and Disclosure Plan (2012) • EHS Guidelines: Air emissions and ambient air quality (2007) • EHS Guidelines: Energy conservation (2007) • EHS Guidelines: Wastewater and ambient water quality (2007) • EHS Guidelines: Water conservation (2007) • EHS Guidelines: Hazardous materials management • EHS Guidelines: Waste management (2007) • EHS Guidelines: Noise (2007) • EHS Guidelines: occupational health and safety (2007) • EHS Guidelines: Community health and safety (2007) • Construction and decommissioning (2007) • EHS Guidelines: Electric power transmission and distribution (2007) • EHS Guidelines: Geothermal power generation (2007) • EHS Guidelines: Thermal power (2015) • EHS Guidelines: Wind energy (2007) • IFC Cumulative Assessment Handbook (2013)	
China Development Bank	None at present-	None at present-	None at present-
Japanese International Cooperation Agency	• Guidelines for environmental and social considerations (2010)	None at present-	• Screening, monitoring and evaluation forms: o Thermal power station o Hydropower stations, dams and reservoirs o Geothermal power station o Other electric generation o Power transmission and distribution lines

SAPP ESMF Appendix D – National and International Safeguard Requirements

Financial Institutional	General Environmental & Social Management	Specific Operating Policies, Frameworks, Guidelines & Standards on Environmental and Social Issues	Monitoring and Evaluation on Environmental and Social Issues
Development Bank of Southern Africa	• Safeguard 1: Environmental and social safeguard standards (2015) • Environmental and social safeguard support tools	• Safeguard 2: Protection of natural habitats (2015) • Safeguard 3: Involuntary resettlement (2015) • Safeguard 4: Community stakeholders and vulnerable groups (including indigenous peoples) (2015) • Safeguard 5: Pest management (2015) • Safeguard 6: Physical and cultural resources (2015) • Safeguard 7: Safety of dams (2015) • Safeguard 8: Labour guidelines (2015) *The implementation of the above-mentioned safeguards is guided by detailed sectoral guidelines which include: • Screening of biodiversity • Natural habitat management • Integrated water and land resource management • Water utilisation and waste management (pollution control) • Energy project • Social and institutional guidelines • Environmental appraisal framework • Guidelines to regional socio-economic analysis (2001)	• Safeguard 1: Environmental and social safeguard standards (2015)
Swedish International Development Agency	• Guidelines for environmental impact assessment in international development cooperation (1998) • Strategic environmental assessment (2005) • A directory of impact assessment guidelines (1998)	• Sector programmes: guidelines for the dialogue on strategic environmental assessment (2002) • Policy and action programme for sustainable development (1996) • Guidelines for grants to non-governmental organisations for humanitarian projects (2007) • Guidelines for corporate social responsibility (2005) • Results strategy for global action on socially sustainable development 2014 - 2017 • Swedish Strategy for Multilateral Development Cooperation • Strategy for capacity development and collaboration 2011–2013 • Strategy for special initiatives for democratisation and freedom of expression, 2012–2014 • Environment policy division: Integrating the environment (2004)	• Indicators for environmental monitoring in international development cooperation (2002)

SAPP ESMF Appendix D – National and International Safeguard Requirements

Financial Institutional	General Environmental & Social Management	Specific Operating Policies, Frameworks, Guidelines & Standards on Environmental and Social Issues	Monitoring and Evaluation on Environmental and Social Issues
KFW Development Bank	• Environmental and social impact assessments at KFW Development Bank (2016)	• Sustainability Guidelines of KfW Group • Sustainability Guideline of KfW Development Bank • Guideline of KfW IPEX-Bank for an environmentally and socially sound conduct of business • DEG Guideline for environmental and social sustainability • Germany's National Sustainability Strategy • UNEP Statement by Financial Institutions on the Environment & Sustainable Development • Principles for Responsible Investment (PRI) • Performance Standards of the International Finance Corporation (see IFC section) • Environmental, Health, and Safety (EHS) Guidelines of the World Bank Group (see World Bank section) • The Equator Principles (see IFC section) • Declaration of human rights (2008) • Guidelines for financing coal powered plants (2015)	• Environmental and social impact assessments at KFW Development Bank (2016)

Appendix E: Environmental and Social Screening Checklist

Environmental and Social Screening Checklist

This checklist is intended for use during the project concept or pre-feasibility phase when an initial site visit is undertaken to a proposed greenfield (new development) and brownfield (expansion of existing facility or modified environment) project. The checklist should be used in an integrated manner, noting the dynamic interactions between biophysical, socio-economic and institutional environments.

There are two components to the checklist which need to be completed:
Part A: Project-specific information; and
Part B: Applicable World Bank safeguard policies.

PART A: PROJECT-SPECIFIC INFORMATION

SECTION A: PROJECT DETAILS

A1	Project details	
1	Name of utility/IPP	
2	Name of project	
3	Energy type	
4	Location of project (town, province/region, country)	
5	Estimated cost	
6	Proposed date of commencement of work	
7	Contact person	
8	Job title	
9	Contact number	
10	Email address	

A2	Project characterization	Yes	No	Comment/ Description
Provide a description of the project technical data by answering and (where necessary) elaborating on the questions below.				
1	Is there a motivation/ justification for the project? If yes, describe			
2	Are there any associated and consequent ventures related to the project (e.g. proposed future phases/projects)? If yes, describe			
3	Does the project include any of the following project stages (e.g. pre-construction, construction, operation and decommissioning)? If yes, describe			
4	Has the project investigated locational, technological and design alternatives? If yes, describe			
5	Has the typical process flow for the energy project been developed? If yes, describe and/or attach			
6	Does the project include infrastructure to support construction and operation (e.g. accommodation, access roads, power, water, services, labour requirements)? If yes, describe			
7	Does the project have a direct and indirect area of influence (e.g. local, regional, national, and international)? If yes, describe			
8	Has a schedule (e.g. prefeasibility, feasibility, construction, project start-up) been developed for the project? If yes, describe and/or attach			

SECTION B: PROJECT CONTEXT

B1	Project context	Yes	No	Comment/ Description
Identify and describe the main biophysical, socio-economic, governance and safety/ security features/constraints within and surrounding the project footprint (e.g. power plant, powerline) by answering and (where necessary) elaborating on the questions below.				
Biophysical				
1	Are there topographic features in the project area (e.g. undulating landscape, hills, mountains, floodplains)? If yes, describe			
2	Are there rivers, streams, lakes, wetlands and marshes in the project area and surrounds? If yes, describe			
3	Does the project footprint and surrounds include any conservation/preservation areas (e.g. nature reserves, national parks, world heritage sites)? If yes, describe			
4	Does the project footprint and surrounds include any areas of high biodiversity importance (e.g. sensitive or threatened habitats/species)? If yes, describe			
5	Does the project footprint include priority ecological corridor areas/migratory routes for wildlife? If yes, describe			
Socio-economic				
6	Are there any national security areas (e.g. military base) within the project area or surrounds? If yes, describe			
7	Does the project footprint and surrounding area include indigenous peoples and traditional lands? If yes, describe			
8	Are there any vulnerable groups (e.g. widows, orphans, disabled, chronically ill, youth, child/forced labour) situated within or surrounding the project footprint? If yes, describe			
9	Is there any evidence of archaeological, historical and/or sacred sites within or surrounding the project footprint? If yes, describe and provide coordinates			
10	Are there any human settlements (e.g. towns, villages and rural properties) within or surrounding the project footprint? If yes, describe			
11	Is there any community infrastructure (e.g. clinics, schools) within or surrounding the project footprint? If yes, describe			
12	Does the project and surrounding area include service infrastructure (e.g. powerlines, roads, boreholes and wells)? If yes, describe			

B1	Project context	Yes	No	Comment/ Description
13	Are there local languages spoken in the project area? If yes, list			
14	Are there existing employment opportunities (e.g. formal, informal) in the project area? If yes, describe			
15	Are there any economic activities and land uses (e.g. residential, commercial, agriculture, tourism) within or surrounding the project footprint? If yes, describe			
Governance, policy and planning				
16	Does the project area include any key political, administrative and traditional structures? If yes, describe			
17	Are there any policies, plans and programs (whether public or private) that apply and/or are being implemented in the area? If yes, describe			
Safety and security				
18	Is there any potential for unexploded ordinance (UXO) in the project area? If yes, describe			
19	Are there any security concerns (e.g. political/social unrest) in the project area? If yes, describe			

SECTION C: STAKEHOLDER CONTEXT

C1	Stakeholder Context	Yes	No	Comment/ Description
Identify and describe the key stakeholders within and surrounding the project footprint (e.g. power plant, powerline) by answering and (where necessary) elaborating on the questions below. Where possible, consult key stakeholders during the site visit.				
1	Are there any stakeholders within or surrounding the project area? If yes, describe and indicate if they are project affected and/ or interested parties			
2	Are there any government institutions (e.g. local, district, regional/provincial) located within or have jurisdiction over the project area and surrounds? If yes, describe			
3	Are there any traditional leaders located within or have influence over the project area and surrounds? If yes, describe			
4	Are there any landowners (e.g. farmers) within or surrounding the project area? If yes, list			
5	Are there any communities within or surrounding the project area? If yes, list			
6	Are there any business owners within or surrounding the project area? If yes, list			
7	Are there any civil society organisations (e.g. NGOs, CBOs) located and/or active in or surrounding the project area? If yes, list			
8	Are there any vulnerable groups within or surrounding the project area? If yes, describe			
9	Are there any special interest groups (e.g. wildlife conservation forum) within or surrounding the project area? If yes, list			
10	Are there any religious groups within or surrounding the project area? If yes, list			
11	Are there any existing projects within/surrounding the project footprint? If yes, list and describe			
12	Are there any existing mechanism/systems (e.g. traditional structures and community forums) to capture grievances raised by stakeholders within or surrounding the project footprint? If yes, list and describe			

SECTION D: POTENTIAL RISKS AND IMPACTS

D1	Potential risks	Yes	No	Comment/ Description
A risk is defined as a probability of danger, injury, liability, loss or any other negative occurrence that is caused by external or internal vulnerabilities and that may be avoided through pre-emptive action.				
Based on information documented in Sections B and C, identify and list any key environmental, socio-economic, political and institutional **risks** associated with the project by answering and (where necessary) elaborating on the questions below. ***Refer to Appendix J of the ESMF for examples of potential risks and impacts arising from power generation and transmission projects***				
1	Are there any environmental risks (e.g. climate change, droughts, landslides, earthquakes, deforestation, pollution) associated with the project? If yes, list and describe			
2	Are there any socio-economic risks (e.g. demographic changes, unemployment, social upheaval, diseases, resettlement, financial or currency crises) associated with the project? If yes, list and describe			
3	Are there any political risks (e.g. security, ethnic conflict, terrorism, politically induced malfunction on social programs) associated with the project? If yes, list and describe			
4	Are there any institutional risks (e.g. limited capacity, lack of skills, corruption, weak budget processes) associated with the project? If yes, list and describe			

D2	Potential impacts	Yes	No	Comment/ Description
Environmental and social impacts refer to any change, potential or actual, to (i) the physical, natural, or cultural environment, and (ii) impacts on surrounding community and workers, resulting from the business activity to be supported (World Bank, 2016).				
Based on information documented in Sections B and C, identify and list any key environmental and socio-economic i**mpacts** (whether negative or positive, direct or indirect, reversible or irreversible) that may arise as a result of the project by answering and (where necessary) elaborating on the questions below. ***Refer to Appendix J of the ESMF for examples of potential risks and impacts arising from power generation and transmission projects***				
1	Are there any environmental impacts (e.g. landscape changes, air pollution, land contamination, biodiversity loss, change in river hydrology, water usage) that are likely to occur as a result of the project? If yes, list and describe indicating whether negative or positive, direct or indirect, reversible or irreversible			
2	Are there any social impacts (e.g. restriction on land use, social influx, involuntary resettlement, loss of livelihoods, loss of cultural heritage assets) that are likely to occur as a result of the project? If yes, list and describe indicating whether negative or positive, direct or indirect, reversible or irreversible			
3	Are there any economic impacts (e.g. land capability changes, job creation, value added gross geographic product) that are likely to occur as a result of the project? If yes, list and describe indicating whether negative or positive, direct or indirect, reversible or irreversible			

SECTION E: LEGAL / LENDER CONTEXT

E1	Project Categorisation	Yes	No	Comment/ Description
Based on the project description (Section A), environmental and socio-economic features/constraints of the project area (Section B and C) and potential risks and impacts (Section D), indicate whether the project will be classified Category A, B and C. ***Refer to Table 7.1 of the ESMF for description of each project risk category***				
1	Should the project be classified as a Category A? If yes, explain			
2	Should the project be classified as a Category B? If yes, explain			
3	Should the project be classified as a Category C? If yes, explain			

E2	National legislative requirements	Yes	No	Comment/ Description
Specify if there are any national laws applicable to the project by answering and (where necessary) elaborating on the questions below. ***Refer to EMSF Appendix D Table 1 for an overview of national legislation for SAPP member states***				
1	Will the project require an environmental authorisation informed by an ESIA? If yes, specify the relevant law and competent authority			
2	Will the project require other permits and/or licences for water use, air emissions, solid waste disposal/management, effluent discharge, biodiversity loss and heritage disturbance/destruction etc.? If yes, specify the permit/ licence, relevant law and competent authority			
3	Will the project require any land rezoning? If yes, explain			

E3	International requirements	Yes	No	Comment/ Description
Specify if there are any international funding requirements applicable to the project by answering and (where necessary) elaborating on the questions below. ***Refer to ESMF Appendix D Table 2 for overview of financial institutions specific policies, standards and guidelines***				
1	Are there any international lender/s that are likely to be approached to fund the project? If yes, specify			
2	Will funds from an international lender/s be required for any phase/s of the project (e.g. project preparation, construction, implementation)? If yes, specify which phase/s will require funding			
3	Will different lenders be financing various phases of the project? If yes, specify the lender and the phase			
4	Do international lender/s have environmental and social safeguard requirements that will need to be adhere to. If yes, specify ***To determine which World Bank safeguard polices will be applicable to the project, complete the checklist contained in Part B below***			

PART B: APPLICABLE WORLD BANK SAFEGUARD POLICIES

For projects that require World Bank funding, the following checklists should be used to screen SAPP AREP projects to determine which World Bank safeguards policies will be applicable.

OP/BP 4.04 OP/BP 4.36	**Natural Habitats Forests**	**Yes**	**No**
Natural habitats are defined as land and water areas where the ecosystems' biological communities are formed largely by native plant and animal species, and human activity has not essentially modified the area's primary ecological functions.			
1	Will the project result in significant degradation or conversion of critical natural habitats and/or forests in protected areas, proposed protected areas or areas that are considered of special ecological significance? If yes, what is the consequence? (If yes, the project is excluded from Bank financing).		
2	Will the project have or may have impacts on natural habitats?		
3	Will the project have or may have impacts on the health and quality of forests		
4	Will the project affect the rights and welfare of people and their level of dependence upon or interaction with forests; or		
5	Will the project bring about changes to the management, protection, or utilization of natural forests or plantations, whether they are publicly, privately, or communally owned?		
If the answer to any of above questions is YES, OP/BP 4.04 and/or OP/BP4.36 will apply.			

OP/BP 4.10	**Indigenous Peoples**	**Yes**	**No**
The World Bank policy on indigenous peoples, underscores the need that subproject developers identify indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated.			
1	Are Indigenous Peoples present/reside in the project area?		
If the answer is YES, OP/BP 4.10 will apply and an Indigenous Peoples Plan is required.			

OP/BP 4.11	**Physical Cultural Resources**	**Yes**	**No**
Physical cultural resources include movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic or other cultural significance.			
1	Will the project cause temporary or permanent relocation or any other type of impact on physical cultural resources known to be of local, regional or national significance based on national or provincial lists, proposed national or provincial lists and/or identified during public consultation with local affected groups?		
2	Are any physical cultural resources considered especially important or sensitive particularly to local groups (e.g. gravesites)?		
3	Are chance find procedures in place?		
If the answer to any of the above questions is YES, OP/BP 4.11 will apply.			

OP/BP 4.12	**Involuntary Resettlement**	**Yes**	**No**
The Involuntary Resettlement safeguard will apply in those situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.			
1	Is any land used by people/organizations likely to be acquired as a result of the project?		
2	Will any project activity involve restrictions of use on adjoining land?		
3	Is land ownership affected by the project?		
4	Will there be a loss of housing or assets or incomes of local people/organizations?		
5	Will any social or economic activities be affected by land use related changes?		
If the answer to any of the above questions is YES, OP/BP 4.12 will apply and a Resettlement Plan is required.			

P/BP 4.37	**Safety on Dams**	**Yes**	**No**
The Safety on Dams Safeguard requires that experienced and competent professionals design and supervise construction, and that the borrower adopts and implements dam safety measures through the project cycle. The policy also applies to existing dams where they influence the performance of a project. In this case, a dam safety assessment should be carried out and necessary additional dam safety measures implemented. *This policy will apply if the project is to be considered a large dam according to the criteria below and therefore will require that a Dam Safety Assessment be completed.*			
1	Is the dam height 15 meters or greater?		
2	Is dam storage 3 million cubic meter or more?		
3	The dam height is between 10 and 15 meters but the dam presents special complexities (for example large flood-handling requirement, location in a zone of high seismicity, foundations that are complex and difficult to prepare, or retention of toxic materials?		
4	Is the dam expected to become a large dam during the operation of the facility?		
If the answer to any of the above questions is YES, the dam is considered to be a large dam and the establishment of a panel of experts and preparation of dam safety assessments will be required.			

OP/BP 7.50	Projects on International Waterways	Yes	No
The objective of OP/BP 7.50 is to ensure that World Bank-financed projects affecting international waterways would not affect relations between the World Bank and its Borrowers and between states and also not affect the efficient utilization and protection of international waterways. It applies to projects that involve the use and/or potential pollution of international waterways.			
1	Is the project the first project downstream of a river that flows from another country?		
2	Is the project the last project on a river that flows into another country?		
3	Will the project utilize water from or into a river or river tributary that flows to or through or forms a border with a neighbouring country?		
4	Will the project discharge water from or into a river or river tributary that flows to or through or forms a border with a neighbouring country?		
If answer to any of the above questions is YES, OP/BP 7.50 will apply.			

Appendix F: Terms of Reference

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

- Biodiversity and ecosystem goods and services
- Cultural heritage & palaeontology
- ESIA
- GHG assessment and climate change
- Indigenous Peoples
- Occupational and public health, safety and security
- Oceanography
- Resettlement
- Social baseline and impact assessment
- Soils, land use, land capacity and agriculture
- Stakeholder Engagement Plan
- Water resources

Terms of Reference: Biodiversity and ecosystem goods and services

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

All relevant components of biodiversity need to be identified and assessed for terrestrial, freshwater, nearshore and marine ecosystems as appropriate, including ecosystem goods and services.

1 Flora and Habitats

In general, the following tasks should be undertaken for flora/vegetation investigations:

- Undertake a desktop assessment to identify potential priority species, habitats, ecological corridors, and protected areas, including international, national, regional and local datasets and plans (e.g. Global Biodiversity Hotspots, national spatial biodiversity priority areas, local critical biodiversity areas etc.);
- Undertake a botanical field survey during the rainy season (when most plants are in flower or seeding) and the dry season (when most plants are dormant) to determine the species composition of the project area, or at alternative appropriate times in the flowering season (e.g. spring and autumn);
- Identify various habitat types and spatially illustrate (map) their distribution at a scale appropriate to the site and project[1];
- Provide a description of each habitat type including dominant, indicator, threatened, protected and rare (including regional and local endemic) species, vegetation communities and or habitats;
- Classify habitats into communities and sub-communities where necessary;
- Describe the present ecological state of each habitat type based on international accepted methods (e.g. ecosystem approach to systematic biodiversity planning);
- Describe the conservation importance of each habitat in relation to national and or regional conservation plans (such as those prepared for The Convention on Biological Diversity (CBD));
- Determine whether any of the habitats classify as “Critical Habitat”, based on the High Conservation Value (HCV) method or other internationally accepted methods based on the same principles;
- Identify protected areas (such as those listed on The World Database on Protected Areas (WDPA), RAMSAR database and or Conservation Plans (if in existence) in relation to the site and project are of influence;
- Compile a list of invasive species (if present) for each plant community;
- Compile a list of non-invasive exotic species (if present) for each plant community;
- Compile a list of Red List and protected and/or endemic species for each plant community;
- Compile a list of plant species of ethnobotanical importance within each habitat type;
- Document the status of all relevant species (e.g. IUCN Red List, national or local protection status, regional and local endemism etc.);

[1] For project level assessment, mapping of habitats should typically be undertaken at a minimum scale of 1:5,000 or finer.

- Document the spatial distribution of all species where possible, but manage and illustrate such data appropriately to avoid inappropriate use (e.g. illegal collection of Red List species);
- Consider the importance of sites as corridors between biodiversity priorities, including migration routes and refugia;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on the habitat types;
- Propose avoidance and mitigation measures to avoid/manage impacts on vegetation;
- Where mitigation measures are inadequate to achieve no net loss for Critical Habitats, identify appropriate offset options; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

2 Fauna

In general, the following tasks should be undertaken for fauna investigations:

- Undertake a desktop assessment to identify potential priority species, associated habitats, and ecological corridors or migration routes, including international, national, regional and local datasets and plans (e.g. Global Biodiversity Hotspots, national spatial biodiversity priority areas, local critical biodiversity areas etc.);
- Document the status of all relevant species (e.g. IUCN Red List, national or local protection status, regional and local endemism etc.);
- Design field survey sampling method/s appropriate for all relevant faunal groups;
- Undertake a field survey and identify all species observed in the study area (baseline assessment requirements for faunal groups are described in the sections below):
  - Document the spatial distribution of all species where possible, but manage and illustrate such data appropriately to avoid inappropriate use (e.g. illegal collection of Red List species);
  - Determine whether any of the fauna classify as “Critical Habitat”, based on the High Conservation Value (HCV) method or other internationally accepted methods based on the same principles;
  - Identify migration corridors;
  - Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on fauna;
  - Propose avoidance and mitigation measures for fauna;
  - Where mitigation measures are inadequate to achieve no net loss for Critical Habitats for fauna species, identify appropriate offset options; and
  - Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

Mammals

In general, the following tasks should be undertaken when investigating mammals:

- Compile a list of all potential mammals by means of desktop study, highlighting all potential Red List, protected, rare, and regional and local endemic species. Include a short description of the habitats that key species are associated with;
- Where possible, set up baited traps and/or motion-sensitive cameras to document mammals (diurnal and nocturnal);
- Evaluate the presence of mammals by using tracks, dung, ecological indicators, non-fatal traps and visual sightings of the animals themselves. Undertake a full survey to determine species richness; and
- The following will be recorded during the mammal survey:
  - All mammals encountered or noted (e.g. tracks, dung etc.);
  - Tracks and dung of mammals encountered;
  - The status of all species recorded (e.g. Red List, protected, rare, local endemics);
  - Species listed according to the results of a desktop study, but which were not encountered;
  - Protected species that occur on the potential list, but were not encountered;

  - Possible migratory species that are not on site during the survey, but were assessed from literature reviews;
  - Non-invasive exotic and invasive mammal species occurring on the site.

Chiroptera (Bats)

In general, the following tasks should be undertaken when investigating chiroptera (bats):

- Compile a list of all bat species that could potentially occur on the site, indicating the threatened (Red List) and protected status of each species via a desktop review;
- Design and undertake a field survey to confirm the presence of the various bat species in the project area;
- The following will be recorded during the bat survey:
  - All bats encountered or noted;
  - The status of all species recorded (e.g. Red List, protected, rare, local endemics);
  - Species listed according to the results of a desktop study, but which were not encountered;
  - Possible migratory species that are not on site during the survey, but were assessed from literature reviews; and
  - Protected species that occur on the potential list, but were not encountered.
- Conduct an environmental sensitivity analysis and represent on a sensitivity map, indicating roosting and foraging areas of bats.

Avifaunal (birds)

In general, the following tasks should be undertaken when investigating avifauna (birds):

- Compile a list of all potential birds by means of desktop study, highlighting all highlighting all potential Red List, protected, and regional and local endemic species. Include a short description of the habitats that key species are associated with;
- Evaluate the presence of birds by means of visual sightings (conducted with binoculars), bird calls and mist nets (where necessary);
- The following will be recorded from the bird survey:
  - All birds encountered or noted;
  - The status of all species recorded (e.g. Red List, protected, rare, local endemics);
  - Species listed according to the results of a desktop study, but which were not encountered;
  - Protected species that occur on the potential list, but were not encountered;
  - Non-invasive exotic and invasive species occurring on the site;
  - Identification of closest Important Bird Area(s) (IBA's) or an equivalent internationally accepted database of avifauna areas and migratory routes of conservation significance;
  - Possible migratory species that are not on site during the survey, but were assessed from literature reviews; and
  - A species list of all the birds that can possibly be present project area and surrounds.

Herpetofauna (amphibians and reptiles)

In general, the following tasks should be undertaken when investigating herpetofauna (amphibians and reptiles):

- Compile a list of all potential amphibians and reptiles by means of desktop study, highlighting all highlighting all potential Red List, protected, and regional and local endemic species. Include a short description of the habitats that key species are associated with;
- Evaluate the presence of amphibians and reptiles including techniques such as pitfall traps, nets, visual and audio sampling;
- The following will be recorded during the survey:
  - All amphibians and reptiles encountered or noted (e.g. tracks, dung etc.);
  - Tracks, audio and other observations of all amphibians and reptiles encountered;
  - The status of all species recorded (e.g. Red List, protected, rare, local endemics);

- Species listed according to the results of a desktop study, but which were not encountered;
- Protected species that occur on the potential list, but were not encountered; and
- Possible migratory species that are not on site during the survey, but were assessed from literature reviews.

Aquatic ecology

The aquatic ecology assessment will include the following:

- Compile a list of all potential aquatic invertebrates by means of desktop study, highlighting all highlighting all potential Red List, protected, and regional and local endemic species. Include a short description of the habitats that key species are associated with;
- The assessment of physicochemical variables of the water;
- Determine the presence of aquatic invertebrates including techniques such as nets, electrofishers, collecting pans, tweezers, plastic spoons, plastic “bug boxes” etc.;
- Document aquatic invertebrates recorded, including:
  - All species encountered;
  - The status of all species recorded (e.g. Red List, protected, rare, local endemics);
  - Species listed according to the results of a desktop study, but which were not encountered;
  - Protected species that occur on the potential list, but were not encountered; and
  - Possible migratory species that are not on site during the survey, but were assessed from literature reviews.
- An assessment of the aquatic habitats using all or a combination of the following indices:
  - Invertebrate Habitat Assessment System (IHAS);
  - Intermediate Habitat Integrity Assessment (IHIA); and
  - Intermediate Habitat Integrity Assessment for Freshwater Pans.
- A Biotic Response Indicator Assessment using all or a combination of the following indices:
  - South African Scoring System version 5 (SASS5) or similar internationally accepted approach;
  - The Average Score Per Taxon (ASPT);
  - Macro–Invertebrate Assessment Index (MIRAI);
  - Fish Response Assessment Index (FRAI); and
  - Diatoms, invertebrate and zooplankton identification and isolation.

3 Wetlands

In general, the following tasks should be undertaken for wetland investigations:

- Undertake a desktop delineation of wetlands and riparian zones within and around the project area;
- Undertake ground-truthing / field assessment to verify the wetlands and riparian zone/areas delineated at a desktop level within and around the project area. During the field verification of the wetland and riparian systems, hydric indicator (soil mottling) data and vegetation information will be used to refine the desktop delineated wetlands and riparian zones;
- Classify wetlands within and around the project area according to their HydroGeoMorphic (HGM) setting;
- Determine the Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) of the identified wetlands;
- Map the different wetland types present;
- Establish a baseline of the current state of the riparian zones;
- Undertake a functional assessment of the wetlands on site;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on wetlands;
- Propose avoidance and management measures for wetlands;

- Where mitigation measures are inadequate to achieve no net loss for critical wetlands, identify appropriate offset options; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

4 Nearshore and marine

In general, the following tasks should be undertaken for nearshore and marine investigations:

- Undertake a desktop assessment to identify potential priority species, habitats, migration routes, and protected areas, including international, national, regional and local datasets and plans (e.g. Global Biodiversity Hotspots, national spatial biodiversity priority areas etc.);
- Design field survey method/s appropriate for all relevant biological groups (e.g. algae, corals, plankton, invertebrates, fish, turtles, marine mammals, birds etc.);
- Undertake a field survey and identify all species across relevant biological groups observed in the study area;
- Document the status of all relevant species and habitats (e.g. IUCN Red List, national or local protection status, regional and local endemism etc.);
- Document the spatial distribution of all species where possible, but manage and illustrate such data appropriately to avoid inappropriate use (e.g. illegal collection of Red List species);
- Identify migration routes;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on species, habitats, ecological processes (e.g. migration, upwelling events, spawning etc.);
- Propose avoidance and mitigation measures;
- Where mitigation measures are inadequate to achieve no net loss of Critical Habitats, identify and evaluate viability of appropriate offset options; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

5 Ecosystem goods and services

In general, the following tasks should be undertaken for ecosystem goods and services investigations:

- Utilizing an internationally accepted methodology (such as the Natural Capital Protocol) and a desktop analysis, determine a list of possible ecosystems goods and services relevant to the project and adjacent communities;
- Identifying natural capital assets (ecological infrastructure) and flows (ecosystem services) by ensuring biodiversity and social specialist integration during their site visits. (this could also be undertaken as part of the social or biodiversity field work or by an ecosystem services professional);
- Natural capital related considerations to be included into the development of relevant social questionnaires and household surveys to be undertaken;
- Analyse field data using an internationally recognised standardised method to determine the priority ecosystem goods and services for the project and affected communities based on dependence and impact;
- Where possible and relevant, spatially reflect and or model priority ecosystem goods and services using internationally accepted methodologies and spatial databases;
- If relevant and possible, seek to determine a value (either monetary or non-monetary) of priority ecosystem services using an accepted international methodology;
- Interpret the results to identify potentially significant impacts and provide recommended practical management measures on priority ecosystem services; and
- Based on the findings, develop an ecosystem services assessment report.

6 Visual

- Review available project information (technical and non-technical project documentation);
- Describe, in detail, the existing receiving environment and visual conditions of the surrounding region to form a baseline against which potential visual impacts can be measured and compared;

- Establish the receiving environment by defining the view catchment area, view corridors, viewpoints and potential receptors to the facility;
- Determine the viewer perception by identifying areas of high viewer incidence, in order to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure;
- Undertake a viewshed analysis to determine the potential sensitive viewers and receptors;
- Identify and assess all potential visual impacts associated with the proposed project (direct, indirect and cumulative), including determination of the significance of impacts based on the viewshed results; and
- Identify avoidance and mitigation measures to reduce or eliminate any potential visual impacts.

Terms of Reference: GHG assessment and Climate change

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

- Desktop analysis of international, regional and national commitments and associated policy and regulations regarding GHG reporting and climate change for the particular country;
- Desktop study of relevant climate change science applicable for the particular country and the project, this includes utilizing existing downscaled modelled information (if available), to determine possible climate change scenarios and predicate change of climate variables;
- Identify potential climate change related vulnerabilities, risks and opportunities across the energy value chain (i.e. process inputs for generation and transmission), by undertaking a climate change vulnerability assessment;
- Undertake, using the GHG Protocol or an equivalent internationally accepted methodology, a GHG assessment (limited to Scope 1 and 2 emissions), this includes the interpretation of findings relevant to the contribution or reduction of GHG emissions to national and/or sectoral inventories and targets;
- Identify potential climate change mitigation and adaptation risks and opportunities, including community or ecosystem based adaptation;
- Identify GHG emission reduction actions, offsets and credit opportunities; and
- Identify climate change and GHG impacts and suggest possible management, monitoring and evaluation (M&E) actions as part of the overall environmental management program.

Terms of Reference: Cultural heritage & palaeontology

<u>Note:</u> The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

1 Heritage

- Undertake a Phase 1 Archaeological Impact Assessment;
- Identify, record, photograph and describe sites of archaeological, historical, spiritual or cultural significance[1] (e.g. graves, sacred sites etc.);
- Determine the level of significance of the recorded sites;
- Identify and assess all potential impacts (direct, indirect and cumulative);
- Propose mitigation measures to avoid/manage impacted heritage sites;
- Propose provisions for managing chance finds to address physical cultural resources encountered unexpectedly during project implementation; and
- Propose measures to maintain confidentiality of cultural heritage information where disclosure of the information would compromise or jeopardize the safety or integrity of the cultural resources.

2 Palaeontology

- Undertake a desktop Palaeontological Impact Assessment (PIA) to identify possible palaeontological sites or features by making use of desktop sources;
- Undertake a site visit to inspect the project area, conduct a number of parallel transects over the site to identify palaeontological sites;
- Identify, record, photograph and describe sites of palaeontological interest;
- Determine the level of significance of the recorded palaeontological site; and
- Identify and assess all potential impacts (direct, indirect and cumulative).

[1] Consultation with communities may be essential to record local knowledge, particularly for sites of cultural or spiritual significance.

Terms of Reference: Environmental and Social Impact Assessment

<u>Note:</u> The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

An Environmental and Social Impact Assessment (ESIA) and its associated implementation typically consists of six project phases namely:

- Project inception;
- Scoping;
- Environmental and social impact assessment;
- Management/mitigation planning;
- Authority review; and
- Monitoring and auditing.

The requirements for each of these phases are provided in the sections below.

As part of the environmental authorisation process, a stakeholder engagement process is required to provide sufficient and accessible information regarding the proposed project to stakeholders, in an objective manner. Stakeholder engagement is required for every phase of the project.

1 Project inception

- Literature review and preparation of information needs list;
- Preparation of a database of existing legal and regulatory documents and international guidelines;
- Confirm project scope and team roles and responsibilities;
- Obtain inputs from technical experts and advisors regarding project description;
- Confirm availability of technical information and data;
- Clarify project goals and components, communication and reporting lines;
- Identify alternatives under consideration;
- Determine size of land to be affected by the project including all associated infrastructure (e.g. electricity, water works system, mode of waste disposal, access roads etc.); and
- Finalise project description.

Stakeholder engagement

- Conduct a preliminary stakeholder analysis;
- Prepare a Consultation Framework;
- Undertake stakeholder mapping to identify key stakeholders;
- Develop a preliminary stakeholder database;
- Map stakeholders in GIS and develop an appropriate map/s; and
- Maintain and update stakeholder database and Register of Interested and Affected Parties (I&APs) throughout the process.

2 Scoping phase

- Identify key physical, biological and socio-economic features and issues requiring further investigation (a spatial mapping tool will be utilised to record some of these issues);

- Appoint specialists to undertake specialist studies; and
- Compile a Scoping/Scope of Work Report that outlines the methodology and scope of work for the impact assessment phase.

Stakeholder engagement

- Announce project via appropriate means, such as advertisements, placing site notices around the proposed development site, letters to identified stakeholders etc.;
- Hold scoping focus group meeting/s with identified key stakeholders to introduce project;
- Hold a public open day or meeting to introduce project;
- Make the Scoping Report available for public review; and
- Obtain comments from stakeholders.

3 Environmental and social impact assessment

- Hold a specialist workshop to integrate the various specialist studies, discuss potential impacts and risks and propose avoid and management measures;
- Undertake environmental and social impact assessment;
- Compile draft environmental and social impact assessment and management plan; and
- Compile environmental and social monitoring plan must then be developed.

Stakeholder engagement

- Make draft environmental and social impact assessment and management plan available for review;
- Hold impact assessment feedback meeting with identified key stakeholders;
- Hold a public open day or meeting to provide feedback regarding the findings of the impact assessment;
- Obtain comments from stakeholders and document these in a Comments and Response Report; and
- Document entire stakeholder engagement process.

4 Authority review

- Update and finalise the impact assessment report with addressed comments from stakeholders;
- Submit the updated report to the relevant competent authority; and
- Follow up with authorities on a regular basis to address any queries.

Stakeholder engagement

- Inform stakeholders of authority decision and their rights to appeal the decision (if applicable).

5 Monitoring and auditing

- Undertake monitoring and auditing as per environmental and social monitoring plan and auditing schedule from ESIA recommendations.

6 Methodology

A wide range of impact rating methodologies exist. Rigorous methodologies include the following key characteristics:

- They are systematic;
- They are defensible;
- They are objective to the greatest extent practically possible;

- Subjective aspects, such as judgements and values, are informed by science-based criteria and standards;
- They enable comparisons to be made between impacts across different disciplines; and
- They enable all relevant parties to understand the process and rationale upon which impacts have been assessed.

All impacts should be documented via a definition statement containing the following information:

- The activity (source of impact) and aspect thereof (e.g. site clearing via construction plant causing habitat loss);
- The receptor;
- Whether the impact is direct, indirect or cumulative; and
- Whether the impact is potentially deemed to pose a fatal flaw.

The purpose of the definition statement is to clearly explain how impacts have been interpreted so that others can see the weight attached to different factors and can understand the rationale of the assessment.

The basic elements used in the evaluation of impact significance are described in Table 1 and the characteristics that are used to describe the consequence of an impact are outlined in Table 2.

The mitigation hierarchy must always be applied, which states that the process must begin with anticipation and avoidance of impacts and risks. Where avoidance is not possible, minimisation must then be applied. Where residual impacts remain, compensate/offsetting of risks and impacts must then be implemented as a last resort.

Note: The impact assessment methodology presented in tables 1-4 serve as a generic guideline only. SAPP member utilities will need to follow the assessment methodologies outlined in ESIA regulations or guidelines set by national regulators and/or international funders, where applicable.

Table 1: Key elements in the evaluation of impact significance

Element	Description	Questions applied to the test of significance
Consequence	An impact or effect can be described as the change in an environmental parameter, which results from a particular project activity or intervention. Here, the term “consequence” refers to: (a) The sensitivity of the receiving environment, including its capacity to accommodate the kinds of changes the project may bring about. (b) The type of change and the key characteristics of the change (these are magnitude, extent and duration). (c) The importance of the change (the level of public concern/ value attached to environment by the stakeholders and the change effected by the project). The following should be considered in the determination of impact consequence: (a) Standards and guidelines (thresholds). (b) Scientific evidence and professional judgment. (c) Points of reference from comparable cases. (d) Levels of stakeholder concern.	Will there be a change in the biophysical and/or social environment? Is the change of consequence (of any importance)?
Probability	Likelihood/chances of an impact occurring.	What is the likelihood of the change occurring?
Effectiveness of the management measures	Significance of the impact needs to be determined both without management measures and with management measures. The significance of the unmanaged impact needs to be determined so there is an appreciation of what could occur in the absence of management measures and of the effectiveness of the proposed management measures.	Will the management measures reduce impact to an acceptable level?
Uncertainty/ Confidence	Uncertainty in impact prediction and the effectiveness of the proposed management measures. Sources of uncertainty in impact prediction include: (a) Scientific uncertainty – limited understanding of an ecosystem (or affected stakeholders) and the processes that govern change. (b) Data uncertainty – restrictions introduced by incomplete, contradictory or incomparable information, or by insufficient measurement techniques. (c) Policy uncertainty – unclear or disputed objectives, standards or guidelines. There are several approaches that can be used to address uncertainty in impact prediction, including: (a) ‘Best’ and ‘worst’ case prediction to illustrate the spread of uncertainty. (b) Attaching confidence limits to impact predictions. (c) Sensitivity analysis to determine the effect of small changes in impact magnitude.	What is the degree of confidence in the significance ascribed to the impact?

Table 2: Impact assessment methodology characteristics

Characteristics used to describe consequence	Sub-components	Terms used to describe the characteristic
Type		Biophysical, social or economic
Nature		Direct or indirect, cumulative etc
Status		Positive (a benefit), negative (a cost) or neutral
Phase of project		During pre-construction (if applicable e.g. resettlement), construction, operation, decommissioning/post closure
Timing		Immediate, delayed
Magnitude	**Sensitivity** of the receiving environment/ receptors	High, medium or low sensitivity Low capacity to accommodate the change (impact)/ tolerant of the proposed change
	Severity/ intensity (degree of change measured against thresholds and/or professional judgment)	Gravity/ seriousness of the impact Intensity/ influence/ power/ strength
	Level of stakeholder concern	High, medium or low levels of concern All or some stakeholders are concerned about the change
Spatial extent or population affected The area/population affected by the impact The boundaries at local and regional extents will be different for biophysical and social impacts.		Area/ volume covered, distribution, population Site/Local (social impacts should distinguish between site and local), regional, national or international
Duration (and reversibility) Length of time over which an impact occurs and potential for recovery of the endpoint from the impact		Short term, long term Intermittent, continuous Reversible/ irreversibility Temporary, permanent
Confidence Based on information available and competencies of the assessor		High, Medium, Low

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical environmental and social impacts requiring consideration in the management and approval process; secondly, it serves to show the primary impact characteristics, as defined above, used to evaluate impact significance. An example of an impact significance rating system is presented in Table 3.

Table 3: An example of an impact assessment significance rating system

<table>
<tr><th colspan="6">PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE
Use these definitions to define the consequence in Part B</th></tr>
<tr><th>Impact characteristics</th><th>Definition</th><th colspan="4">Criteria</th></tr>
<tr><td rowspan="6">MAGNITUDE</td><td>Major -</td><td colspan="4">Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded</td></tr>
<tr><td>Moderate -</td><td colspan="4">Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded</td></tr>
<tr><td>Minor -</td><td colspan="4">Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded</td></tr>
<tr><td>Minor+</td><td colspan="4">Minor improvement; change not measurable; or threshold never exceeded</td></tr>
<tr><td>Moderate+</td><td colspan="4">Moderate improvement; within or better than the threshold; or no observed reaction</td></tr>
<tr><td>Major+</td><td colspan="4">Substantial improvement; within or better than the threshold; or favourable publicity</td></tr>
<tr><td rowspan="3">SPATIAL SCALE OR POPULATION</td><td>Site or local</td><td colspan="4">Site specific or confined to the immediate project area</td></tr>
<tr><td>Regional</td><td colspan="4">May be defined in various ways, e.g. cadastral, catchment, topographic</td></tr>
<tr><td>National/ International</td><td colspan="4">Nationally or beyond</td></tr>
<tr><td rowspan="3">DURATION</td><td>Short term</td><td colspan="4">Up to 12 months</td></tr>
<tr><td>Medium term</td><td colspan="4">12 months to 5 years</td></tr>
<tr><td>Long term</td><td colspan="4">Longer than 5 years</td></tr>
<tr><th colspan="6">PART B: DETERMINING CONSEQUENCE RATING
Rate consequence based on definition of magnitude, spatial extent and duration</th></tr>
<tr><td colspan="3" rowspan="2"></td><td colspan="3">SPATIAL SCALE/ POPULATION</td></tr>
<tr><td>Site or Local</td><td>Regional</td><td>National/ international</td></tr>
<tr><td>MAGNITUDE</td><td colspan="5"></td></tr>
<tr><td rowspan="3">Minor</td><td rowspan="3">DURATION</td><td>Long term</td><td>Medium</td><td>Medium</td><td>High</td></tr>
<tr><td>Medium term</td><td>Low</td><td>Low</td><td>Medium</td></tr>
<tr><td>Short term</td><td>Low</td><td>Low</td><td>Medium</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="3">Moderate</td><td rowspan="3">DURATION</td><td>Long term</td><td>Medium</td><td>High</td><td>High</td></tr>
<tr><td>Medium term</td><td>Medium</td><td>Medium</td><td>High</td></tr>
<tr><td>Short term</td><td>Low</td><td>Medium</td><td>Medium</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="3">Major</td><td rowspan="3">DURATION</td><td>Long term</td><td>High</td><td>High</td><td>High</td></tr>
<tr><td>Medium term</td><td>Medium</td><td>Medium</td><td>High</td></tr>
<tr><td>Short term</td><td>Medium</td><td>Medium</td><td>High</td></tr>
<tr><th colspan="6">PART C: DETERMINING SIGNIFICANCE RATING
Rate significance based on consequence and probability</th></tr>
<tr><td colspan="3" rowspan="2"></td><td colspan="3">CONSEQUENCE</td></tr>
<tr><td>Low</td><td>Medium</td><td>High</td></tr>
<tr><td colspan="2" rowspan="3">PROBABILITY
(of exposure to impacts)</td><td>Definite</td><td>Medium</td><td>Medium</td><td>High</td></tr>
<tr><td>Possible</td><td>Low</td><td>Medium</td><td>High</td></tr>
<tr><td>Unlikely</td><td>Low</td><td>Low</td><td>Medium</td></tr>
<tr><th colspan="6">PART D: CONFIDENCE LEVEL</th></tr>
<tr><td colspan="3">High</td><td>Medium</td><td colspan="2">Low</td></tr>
</table>

Practical management measures and recommendations and post management significance must be listed, using a GIIP management hierarchy in that:

"Recommendations for management should focus on avoidance, and if avoidance is not possible, then to reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design."

The significance of impacts must then be re-assessed with assumed management measures in place ("after management"). Specialists must recommend and describe appropriate monitoring and review programs to track the efficacy of management measures. These should then be included as Action Plans.

An example of a table report on the significance rating for each impact before and after the implementation of mitigation / management measures, and listing these measures, is presented in Table 4.

Table 4: An example of impact significance rating and mitigation measures for an impact

Impact xx: ………								
	Magnitude	**Duration**	**Scale**	**Consequence**	**Probability**	**Significance**	**+ /-**	**Confidence**
Before Management	*Moderate*	*Long term*	*Site / local*	***Medium***	***Possible***	***Medium***	-	*Medium*
Management Measures: • •								
After Management	*Minor*	*Short term*	*Site / local*	***Low***	***Unlikely***	***Low***	-	*Medium*

Terms of Reference: Indigenous Peoples

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

This Terms of Reference (ToR) was written using the guiding principles outlined in the World Bank, OP 4.10 Indigenous Peoples, July 2005. Please refer to this Policy when preparing Indigenous Peoples Plans (IPPs and Indigenous Peoples Planning Frameworks (IPPFs) for Bank-financed projects.

The term Indigenous Peoples refers to a "*distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:*

- *self-identification and identification by others;*
- *collective attachment to land and natural resources (may include fishing rights);*
- *customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and*
- *indigenous language".*

Indigenous People Project Preparation:

According to OP 4.10 the following steps need to be followed with regards to Indigenous People:

1. Screening:

The Bank will undertake a screening process to determine whether Indigenous Peoples are present in, or have collective attachment to, the project area. In conducting this screening, the Bank will have to seek the technical judgment of qualified social scientists with expertise on the social and cultural groups in the project area. The Bank will have to also consult with the Indigenous Peoples concerned and the borrower. The Bank may follow the borrower's framework for identification of Indigenous Peoples during project screening, when that framework is consistent with this policy.

2. Social Assessment

Analysis, if based on the screening, the Bank concludes that Indigenous Peoples are present in, or have collective attachment to, the project area, the borrower will have to undertake a social assessment to evaluate the project's potential positive and adverse effects on the Indigenous Peoples, and to examine project alternatives where adverse effects may be significant. The breadth, depth, and type of analysis in the social assessment will be proportional to the nature and scale of the proposed project's potential effects on the Indigenous Peoples, and whether such effects are positive or adverse. To carry out the social assessment, the borrower must engage with social scientists whose qualifications, experience, and terms of reference are acceptable to the Bank.

3. Consultation and Participation

Where the project affects Indigenous Peoples, the borrower must engage in free, prior, and informed consultation with them. To ensure such consultation, the borrower must:

- establishes an appropriate gender and intergenerationally inclusive framework that provides opportunities for consultation at each stage of project preparation and implementation among the borrower, the affected Indigenous Peoples' communities, the Indigenous Peoples Organizations (IPOs) if any, and other local civil society organizations (CSOs) identified by the affected Indigenous Peoples' communities;

- uses consultation methods appropriate to the social and cultural values of the affected Indigenous Peoples' communities and their local conditions and, in designing these methods, gives special attention to the concerns of Indigenous women, youth, and children and their access to development opportunities and benefits; and
- provide the affected Indigenous Peoples' communities with all relevant information about the project (including an assessment of potential adverse effects of the project on the affected Indigenous Peoples' communities) in a culturally appropriate manner at each stage of project preparation and implementation.

In deciding whether to proceed with the project, the borrower must ascertain, based on the social assessment and the free, prior, and informed consultation, whether the affected Indigenous Peoples' communities provide their broad support to the project. Where there is such support, the borrower must prepare a detailed report that documents:

- the findings of the social assessment;
- the process of free, prior, and informed consultation with the affected Indigenous Peoples' communities;
- additional measures, including project design modification, that may be required to address adverse effects on the Indigenous Peoples and to provide them with culturally appropriate project benefits;
- recommendations for free, prior, and informed consultation with and participation by Indigenous
- Peoples' communities during project implementation, monitoring, and evaluation; and
- any formal agreements reached with Indigenous Peoples' communities and/or the IPOs.

The Bank will thereafter review the process and the outcome of the consultation carried out by the borrower to satisfy itself that the affected Indigenous Peoples' communities have provided their broad support to the project. The Bank will pay attention to the social assessment and to the record and outcome of the free, prior, and informed consultation with the affected Indigenous Peoples' communities as a basis for ascertaining whether there is such support. The Bank will not proceed further with project processing if it is unable to ascertain that such support exists.

4. Indigenous Peoples Plan (IPP)

Based on the social assessment and in consultation with the affected Indigenous Peoples' communities, the borrower is required to prepare an IPP that sets out the measures through which the borrower will ensure that:

(a) Indigenous Peoples affected by the project receive culturally appropriate social and economic benefits; and

(b) when potential adverse effects on Indigenous Peoples are identified, those adverse effects are avoided, minimized, mitigated, or compensated for. The IPP is prepared in a flexible and pragmatic manner, and its level of detail varies depending on the specific project and the nature of effects to be addressed. The borrower integrates the IPP into the project design. When Indigenous Peoples are the sole or the overwhelming majority of direct project beneficiaries, the elements of an IPP should be included in the overall project design, and a separate IPP is not required. In such cases, the Project Appraisal Document (PAD) will include a summary of how the project complies with the policy, in particular the IPP requirements.

5. Indigenous Peoples Planning Framework (IPPF)

Some projects involve the preparation and implementation of annual investment programs or multiple subprojects. In such cases, and when the Bank's screening indicates that Indigenous Peoples are likely to be present in, or have collective attachment to, the project area, but their presence or collective attachment cannot be determined until the programs or subprojects are identified, the borrower is required to prepare an IPPF. The IPPF provides for the screening and review of these programs or subprojects in a manner consistent with this policy. The borrower will integrate the IPPF into the project design.

If the screening of an individual program or subproject identified in the IPPF indicates that Indigenous Peoples are present in, or have collective attachment to, the area of the program or subproject, the borrower will need to ensure that, before the individual program or subproject is implemented, a social assessment is carried out and an IPP is prepared in accordance with the requirements of this policy. The borrower will provide each IPP to the Bank for review before the respective program or subproject is considered eligible for Bank financing.

6. Disclosure

The borrower will make the social assessment report and draft IPP/IPPF available to the affected Indigenous Peoples' communities in an appropriate form, manner, and language. Before the project appraisal, the borrower will need to send the social assessment and draft IPP/IPPF to the Bank for review. Once the Bank accepts the documents as providing an adequate basis for project appraisal, the Bank makes them available to the public in accordance with "*The World Bank Policy on Access to Information*", and the borrower will need to make them available to the affected Indigenous Peoples communities in the same manner as the earlier draft documents.

NB: *Refer to OP4.10, July 2005 for special considerations that need to be taken into account when the project will (i) affect lands and related natural resources of Indigenous Peoples; (ii) involve commercial development of natural and cultural resources of IPs; or (iii) cause physical relocation of IPs.*

7. Templates of Instruments

Social Assessment

1. The breadth, depth, and type of analysis required for the social assessment are proportional to the nature and scale of the proposed project's potential effects on the Indigenous Peoples.
2. The social assessment includes the following elements, as needed:
   a) A review, on a scale appropriate to the project, of the legal and institutional framework applicable to Indigenous Peoples.
   b) Gathering of baseline information on the demographic, social, cultural, and political characteristics of the affected Indigenous Peoples' communities, the land and territories that they have traditionally owned or customarily used or occupied, and the natural resources on which they depend.
   c) Taking the review and baseline information into account, the identification of key project stakeholders and the elaboration of a culturally appropriate process for consulting with the Indigenous Peoples at each stage of project preparation and implementation (see paragraph 9 of this policy).
   d) An assessment, based on free, prior, and informed consultation, with the affected Indigenous Peoples' communities, of the potential adverse and positive effects of the project. Critical to the determination of potential adverse impacts is an analysis of the relative vulnerability of, and risks to, the affected Indigenous Peoples' communities given their distinct circumstances and close ties to land and natural resources, as well as their lack of access to opportunities relative to other social groups in the communities, regions, or national societies in which they live.
   e) The identification and evaluation, based on free, prior, and informed consultation with the affected Indigenous Peoples' communities, of measures necessary to avoid adverse effects, or if such measures are not feasible, the identification of measures to minimize, mitigate, or compensate for such effects, and to ensure that the Indigenous Peoples receive culturally appropriate benefits under the project.

SAPP ESMF Appendix F – Terms of Reference: Indigenous peoples

Indigenous Peoples Plan

1. The Indigenous Peoples Plan (IPP) is prepared in a flexible and pragmatic manner, and its level of detail varies depending on the specific project and the nature of effects to be addressed.
2. The IPP includes the following elements, as needed:

a) A summary of the social assessment.

b) A summary of results of the free, prior, and informed consultation with the affected Indigenous Peoples' communities that was carried out during project preparation and that led to broad community support for the project.

c) A framework for ensuring free, prior, and informed consultation with the affected Indigenous Peoples' communities during project implementation.

d) An action plan of measures to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate, including, if necessary, measures to enhance the capacity of the project implementing agencies.

e) When potential adverse effects on Indigenous Peoples are identified, an appropriate action plan of measures to avoid, minimize, mitigate, or compensate for these adverse effects.

f) The cost estimates and financing plan for the IPP.

g) Accessible procedures appropriate to the project to address grievances by the affected Indigenous Peoples' communities arising from project implementation. When designing the grievance procedures, the borrower takes into account the availability of judicial recourse and customary dispute settlement mechanisms among the Indigenous Peoples.

h) Mechanisms and benchmarks appropriate to the project for monitoring, evaluating, and reporting on the implementation of the IPP. The monitoring and evaluation mechanisms should include arrangements for the free, prior, and informed consultation with the affected Indigenous Peoples' communities.

Indigenous Peoples Planning Framework

The Indigenous Peoples Planning Framework (IPPF) sets out:

a) The types of programs and subprojects likely to be proposed for financing under the project.

b) The potential positive and adverse effects of such programs or subprojects on Indigenous Peoples.

c) A plan for carrying out the social assessment for such programs or subprojects.

d) A framework for ensuring free, prior, and informed consultation with the affected Indigenous Peoples' communities at each stage of project preparation and implementation.

e) Institutional arrangements (including capacity building where necessary) for screening project-supported activities, evaluating their effects on Indigenous Peoples, preparing IPPs, and addressing any grievances.

f) Monitoring and reporting arrangements, including mechanisms and benchmarks appropriate to the project.

g) Disclosure arrangements for IPPs to be prepared under the IPPF."

Terms of Reference: Occupational and public health, safety and security

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

1 Socio-economic

- Profile of the existing socio-economic environment;
- Define the Primary Area of Influence and Secondary Area of Influence of the project;
- Identify socially sensitive areas;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on the socio-economic environment;
- Propose mitigation measures to avoid/manage impacts on the socio-economic environment; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

2 Occupational and community health and safety

- Refer to World Bank Group Environment, Health and Safety Guidelines (EHSGs) applicable to the project;
- Identify and assess potential health and safety risks and impacts of the proposed project; and propose appropriate mitigation measures;
- Assess risks posed by these security arrangements to those within and outside the project site;
- Apply the principles of proportionality and good international industry practice, and by applicable law, in relation to hiring, rules of conduct, training, equipping, and monitoring of such security workers; and
- Propose measures not to allow any use of force by direct or contracted workers in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

3 Influx of labour

- Refer to World Bank guidance note on “Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labour Influx (December 2016);
- Reduce labour influx by tapping into the local workforce;
- Assess and manage labour influx risk based on appropriate instruments, including site-specific Labour Influx Management Plan and/or Worker’s Camp Management Plan; and
- Incorporate mitigation measures into the civil works contract, including worker’s code of conduct and training and awareness raising program fir workers and local community.

4 Traffic

- Identify existing road infrastructure, road safety or public transport related issues on the surrounding road network for existing traffic and pedestrian flows;
- Estimate the potential volume of daily and peak hour external traffic and pedestrians that the new project will generate;
- Assess the traffic and pedestrian impacts of the new project on the surrounding external road network including pedestrians, cyclists, road safety and public transport;

- Assess the structural capacity of the surrounding road network that will carry the additional traffic generated by the project;
- Identify and evaluate alternative routing and modes of transport; and
- Recommend external road network improvements.

5 Air Quality

- Review of available project information (technical and non-technical project documentation);
- Gather and review available climate data for the study area (ideally within a radius of 15 km from the project area) (meteorological data such as temperature, wind directions, wind speeds, rainfall, etc.);
- Prepare an emission inventory for the proposed project in terms of for dust (PM10, PM2.5 and dust fallout) and gases (such as SOx and NOx (if relevant));
- Using an internationally accepted and/or country-regulated methodology, develop an atmospheric dispersion model for dust and gases (if any) for the proposed project (baseline conditions and modelled conditions). Consideration of seasonality needs should be included into the model;
- Undertake an assessment of potential air quality impacts and provide management and mitigation measures together with recommendations (impacts are to be guided by international standards, such as the World Health Organisation (WHO) and country specific standards (where applicable));
- Recommendation of receptor-based performance indicators comprising of an ambient monitoring network and targets; and
- Preparation of an Air Impact Report, summarising the findings of the assessment, to meet requirements and country regulations (if applicable).

6 Noise

- Determine the legislative and regulatory context, including relevant noise standards;
- Determine existing ambient levels of noise at identified noise sensitive sites by conducting representative sound measurements;
- Identify all noise sources relating to the proposed project/activities;
- Determine acceptable rating level for noise at the identified noise sensitive sites;
- Calculate the combined sound power level resulting from the sound emissions of the individual noise sources;
- Calculate the expected rating level of sound at the identified noise sensitive sites from the combined sound power level emanating from identified noise sources;
- Identify and assess all potential noise impacts (direct, indirect and cumulative); and
- Propose mitigation measures to avoid/manage noise impacts.

7 Pest management

- Assess the nature and degree of risks associated with use of pesticide;
- Refer to the World Health Organization's Recommended Classification of Pesticides by Hazard and Guidelines to Classification (Geneva: WHO 1994-95). The following criteria apply to the selection and use of pesticides in the project:
    - They must have negligible adverse human health effects;
    - They must be shown to be effective against the target species;
    - They must have minimal effect on nontarget species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them; and
    - Their use must consider the need to prevent the development of resistance in pests.
- Any pesticides must be manufactured, packaged, labelled, handled, stored, disposed of, and applied according to standards acceptable to the funder; and

- Do not use formulated products that fall in WHO classes IA and IB, or formulations of products in Class II, if (a) the country lacks restrictions on their distribution and use; or (b) they are likely to be used by, or be accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly.

8 Safety of dams

- The World Bank has an operational policy on safety of dams (OP4.37). This policy outlines the safety requirements for the construction of new dams as well as existing dams. The policy acknowledges that in the life of any dam, the owner has full responsibility for the safety of the dam, irrespective of its funding sources or construction status. As there are serious consequences if a dam does not function properly or fails, the Bank is concerned about the safety of new dams it finances and existing dams on which a Bank-financed project is directly dependent;
- For large dams that are 15 meters or more in height or with high risks, the policy requires some key risk assessment and mitigation measures. These includes the establishment of an independent panel of experts; preparation and implementation of detailed plans for construction supervision, quality assurance, instrumentation, operation and maintenance, and emergency preparedness; and
- When the project is financed by the World Bank and involves hydro dams, please refer to this policy to comply with required assessment and mitigation measures.

9 Radiation

- Identify potential sources (for release into air and radioactive effluent);
- Radio-nuclide investigation to include ventings and purges with accurate predictions of decay periods, types of radiation;
- Characterise radionuclides and levels of contamination;
- Identify potential pathways of migration;
- Identify potential receptors;
- Explain the potential impacts on human health;
- Estimate exposure;
- Extend predictions of contaminant concentrations to include potential impact on all surrounding areas;
- Quantify holistic health risks through all pathways and routes of exposure; and
- Propose mitigation measures to minimise or management risks to acceptable levels.

Terms of Reference: Oceanography

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

- Undertake surveys to determine beach and nearshore sea floor profile, erosion or accretion rates, and coastline stability;
- Determine bathymetry;
- Collect relevant data on wave height, period and direction (including extremes);
- Collect data on ocean currents, including inshore and offshore, surface and sub-surface, temporal and spatial variation, and correlations with wind patterns;
- Determine spatial and temporal variation in seawater temperature, salinity and chemistry (including extremes);
- Determine hydrographic fluctuations, including implications due to climatic change;
- Determine spatial and temporal variation in sediment characteristics (physical and chemical);
- Determine gross and net sediment transport rates;
- Identify physical processes that affect the mean sea level and temperature, coastal currents and productivity;
- Identify observed and projected water levels (including extremes);
- Identify potential for coastal flooding (storm surges, astronomical tidal levels, sea level rise, tsunamis);
- Evaluate tsunami risk;
- Where relevant, identify potential for the supply of sea water for cooling and associated factors and impacts such as exposure, blockages of and damage to cooling water intake and the outfall structures;
- Determine the potential for suspended particle ingress into intake basin and future maintenance requirements;
- Determine the likely severity of blockages and fouling;
- Model thermal plume dispersion;
- Model geomorphological changes induced by intake and discharge operations; and
- Identify probability of occurrence and potential mitigation measures which would be required in the event of storms which may result in the clogging and disruption of intake pipelines for seawater.

Terms of Reference: Resettlement Policy Framework and Resettlement Action Plan

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

This Terms of Reference (TOR) was written using the guiding principles in the World Bank, OP4.12 Involuntary Resettlement, 2013. Please refer to this Policy when preparing Resettlement Action Plans (RAPs) and Resettlement Policy Frameworks (RPFs) for Bank-financed projects.

1. Experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.

1 Objectives

2. Involuntary resettlement may cause severe long-term hardship, impoverishment, and environmental damage unless appropriate measures are carefully planned and carried out. For these reasons, the overall objectives of the policy on involuntary resettlement are the following:
    a) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
    b) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
    c) Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

2 Impacts Covered

3. This policy covers direct economic and social impacts that both result from the funded investment projects, and are caused by:
    a) the involuntary taking of land resulting in
        (i) relocation or loss of shelter;
        (ii) loss of assets or access to assets; or
        (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or
    b) the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons.
4. This policy applies to all components of the project that result in involuntary resettlement, regardless of the source of financing. It also applies to other activities resulting in involuntary resettlement that are:
    a) directly and significantly related to the funded project;

   b) necessary to achieve its objectives as set forth in the project documents; and
   c) carried out, or planned to be carried out, contemporaneously with the project.

5. Requests for guidance on the application and scope of this policy should be addressed to the World Bank.

3 Required Measures

6. The borrower prepares a resettlement plan or a resettlement policy framework that covers the following:
   a) The resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are
      (i) informed about their options and rights pertaining to resettlement;
      (ii) consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
      (iii) provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.
   b) If the impacts include physical relocation, the resettlement plan or resettlement policy framework includes measures to ensure that the displaced persons are
      (i) provided assistance (such as moving allowances) during relocation; and
      (ii) provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.
   c) Where necessary to achieve the objectives of the policy, the resettlement plan or resettlement policy framework also include measures to ensure that displaced persons are
      (i) offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living;
      (ii) provided with development assistance in addition to compensation measures described in paragraph 6(a); and
      (iii) such as land preparation, credit facilities, training, or job opportunities.
7. In projects involving involuntary restriction of access to legally designated parks and protected areas (see para.3(b)), the nature of restrictions, as well as the type of measures necessary to mitigate adverse impacts, is determined with the participation of the displaced persons during the design and implementation of the project. In such cases, the borrower prepares a process framework acceptable to the Bank, describing the participatory process by which:
   a) specific components of the project will be prepared and implemented;
   b) the criteria for eligibility of displaced persons will be determined;
   c) measures to assist the displaced persons in their efforts to improve their livelihoods, or at least to restore them, in real terms, while maintaining the sustainability of the park or protected area, will be identified; and
   d) potential conflicts involving displaced persons will be resolved.

The process framework also includes a description of the arrangements for implementing and monitoring the process.

8. To achieve the objectives of this policy, particular attention is paid to the needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation.
9. Experience has shown that resettlement of indigenous peoples with traditional land-based modes of production is particularly complex and may have significant adverse impacts on their identity and cultural survival. For this reason, the Bank satisfies itself that the borrower has explored all viable alternative project designs to avoid physical displacement of these groups. When it is not feasible to avoid such displacement, preference is given to land-based resettlement strategies for these groups (see para. 11) that are compatible with their cultural preferences and are prepared in consultation with them.

10. The implementation of resettlement activities is linked to the implementation of the investment component of the project to ensure that displacement or restriction of access does not occur before necessary measures for resettlement are in place. For impacts covered in para. 3(a) of this policy, these measures include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required. In particular, taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons. For impacts covered in para. 3(b) of this policy, the measures to assist the displaced persons are implemented in accordance with the plan of action as part of the project (see para. 30).
11. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. These strategies may include resettlement on public land, or on private land acquired or purchased for resettlement. Whenever replacement land is offered, resettlers are provided with land for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the land taken. If land is not the preferred option of the displaced persons, the provision of land would adversely affect the sustainability of a park or protected area, or sufficient land is not available at a reasonable price, non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost. The lack of adequate land must be demonstrated and documented to the satisfaction of the Bank.
12. Payment of cash compensation for lost assets may be appropriate where (a) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual is economically viable; (b) active markets for land, housing, and labor exist, displaced persons use such markets, and there is sufficient supply of land and housing; or (c) livelihoods are not land-based. Cash compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.
13. For impacts covered under para. 3(a) of this policy, the following is required:
    a) Displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups.
    b) In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder).
    c) Patterns of community organization appropriate to the new circumstances are based on choices made by the displaced persons. To the extent possible, the existing social and cultural institutions of resettlers and any host communities are preserved and resettlers' preferences with respect to relocating in pre-existing communities and groups are honoured.

4 Eligibility for Benefits

14. Upon identification of the need for involuntary resettlement in a project, the borrower carries out a census to identify the persons who will be affected by the project, to determine who will be eligible for assistance, and to discourage inflow of people ineligible for assistance. The borrower also develops a procedure for establishing the criteria by which displaced persons will be deemed eligible for compensation and other resettlement assistance. The procedure includes provisions for meaningful consultations with affected persons and communities, local authorities, and, as appropriate, nongovernmental organizations (NGOs), and it specifies grievance mechanisms.
15. Criteria for Eligibility. Displaced persons may be classified in one of the following three groups:

a) those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country);

b) those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets--provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan; and

c) those who have no recognizable legal right or claim to the land they are occupying.

16. Persons covered under para. 15(a) and (b) are provided compensation for the land they lose, and other assistance in accordance with para. 6. Persons covered under para. 15(c) are provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy, if they occupy the project area prior to a cut-off date established by the borrower and acceptable to the Bank. Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in para. 15(a), (b), or (c) are provided compensation for loss of assets other than land.

5 Resettlement Planning, Implementation, and Monitoring

17. To achieve the objectives of this policy, different planning instruments are used, depending on the type of project:
    a) a resettlement plan or abbreviated resettlement plan is required for all operations that entail involuntary resettlement unless otherwise specified;
    b) a resettlement policy framework is required for operations referred to in paras. 26-30 that may entail involuntary resettlement, unless otherwise specified; and
    c) a process framework is prepared for projects involving restriction of access in accordance with para. 3(b) (see para. 31).
18. The borrower is responsible for preparing, implementing, and monitoring a resettlement plan, a resettlement policy framework, or a process framework (the "resettlement instruments"), as appropriate, that conform to this policy. The resettlement instrument presents a strategy for achieving the objectives of the policy and covers all aspects of the proposed resettlement. Borrower commitment to, and capacity for, undertaking successful resettlement is a key determinant of Bank’s involvement in a project.
19. Resettlement planning includes early screening, scoping of key issues, the choice of resettlement instrument, and the information required to prepare the resettlement component or subcomponent. The scope and level of detail of the resettlement instruments vary with the magnitude and complexity of resettlement. In preparing the resettlement component, the borrower draws on appropriate social, technical, and legal expertise and on relevant community-based organizations and NGOs. The borrower informs potentially displaced persons at an early stage about the resettlement aspects of the project and takes their views into account in project design.
20. The full costs of resettlement activities necessary to achieve the objectives of the project are included in the total costs of the project. The costs of resettlement, like the costs of other project activities, are treated as a charge against the economic benefits of the project; and any net benefits to resettlers (as compared to the "without-project" circumstances) are added to the benefits stream of the project. Resettlement components or free-standing resettlement projects need not be economically viable on their own, but they should be cost-effective.
21. The borrower ensures that the Project Implementation Plan is fully consistent with the resettlement instrument.
22. As a condition of appraisal of projects involving resettlement, the borrower provides the Bank with the relevant draft resettlement instrument which conforms to this policy and makes it available at a place accessible to displaced persons and local NGOs, in a form, manner, and language that are understandable to them. After the Bank has approved the final resettlement instrument, the Bank and the borrower disclose it again in the same manner.
23. The borrower's obligations to carry out the resettlement instrument and to keep the Bank informed of implementation progress are provided for in the legal agreements for the project.

24. The borrower is responsible for adequate monitoring and evaluation of the activities set forth in the resettlement instrument. The Bank regularly supervises resettlement implementation to determine compliance with the resettlement instrument. Upon completion of the project, the borrower undertakes an assessment to determine whether the objectives of the resettlement instrument have been achieved. The assessment takes into account the baseline conditions and the results of resettlement monitoring. If the assessment reveals that these objectives may not be realized, the borrower should propose follow-up measures that may serve as the basis for continued supervision, as the Bank deems appropriate.

6 Resettlement Instruments

Resettlement Plan

25. A draft resettlement plan that conforms to this policy is a condition of appraisal for projects referred to in para. 17(a) above. However, where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower. The information disclosure procedures set forth in para. 22 apply.

Resettlement Policy Framework

26. For sector investment operations that may involve involuntary resettlement, the Bank requires that the project implementing agency screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the borrower submits, prior to appraisal, a resettlement policy framework that conforms to this policy. The framework also estimates, to the extent feasible, the total population to be displaced and the overall resettlement costs.
27. For financial intermediary operations that may involve involuntary resettlement, the Bank requires that the financial intermediary (FI) screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the Bank requires that before appraisal the borrower or the FI submit to the Bank a resettlement policy framework conforming to this policy. In addition, the framework includes an assessment of the institutional capacity and procedures of each of the FIs that will be responsible for subproject financing. When, in the assessment of the Bank, no resettlement is envisaged in the subprojects to be financed by the FI, a resettlement policy framework is not required. Instead, the legal agreements specify the obligation of the FIs to obtain from the potential sub-borrowers a resettlement plan consistent with this policy if a subproject gives rise to resettlement. For all subprojects involving resettlement, the resettlement plan is provided to the Bank for approval before the subproject is accepted for Bank financing.
28. For other funded project with multiple subprojects that may involve involuntary resettlement, the Bank requires that a draft resettlement plan conforming to this policy be submitted to the Bank before appraisal of the project unless, because of the nature and design of the project or of a specific subproject or subprojects (a) the zone of impact of subprojects cannot be determined, or (b) the zone of impact is known but precise sitting alignments cannot be determined. In such cases, the borrower submits a resettlement policy framework consistent with this policy prior to appraisal. For other subprojects that do not fall within the above criteria, a resettlement plan conforming to this policy is required prior to appraisal.
29. For each subproject included in a project described in para. 26, 27, or 28 that may involve resettlement, the Bank requires that a satisfactory resettlement plan or an abbreviated resettlement plan that is consistent with the provisions of the policy framework be submitted to the Bank for approval before the subproject is accepted for Bank financing.
30. For projects described in paras. 26-28 above, the Bank may agree, in writing, that subproject resettlement plans may be approved by the project implementing agency or a responsible government agency or financial intermediary without prior Bank review, if that agency has

demonstrated adequate institutional capacity to review resettlement plans and ensure their consistency with this policy. Any such delegation, and appropriate remedies for the entity's approval of resettlement plans found not to be in compliance with Bank policy, are provided for in the legal agreements for the project. In all such cases, implementation of the resettlement plans is subject to ex post review by the Bank.

Process Framework

31. For projects involving restriction of access in accordance with para. 3(b) above, the borrower provides the Bank with a draft process framework that conforms to the relevant provisions of this policy as a condition of appraisal. In addition, during project implementation and before to enforcing of the restriction, the borrower prepares a plan of action, acceptable to the Bank, describing the specific measures to be undertaken to assist the displaced persons and the arrangements for their implementation. The plan of action could take the form of a natural resources management plan prepared for the project.

Resettlement Policy Framework

The purpose of the policy framework is to clarify resettlement principles, organizational arrangements, and design criteria to be applied to subprojects to be prepared during project implementation (see OP 4.12, paragraphs. 26- 28).

Subproject resettlement plans consistent with the policy framework subsequently are submitted to the Bank for approval after specific planning information becomes available (see OP 4.12, paragraph 29).

The resettlement policy framework covers the following elements, consistent with the provisions described in OP 4.12, paragraphs 2 and 4:

- A brief description of the project and components for which land acquisition and resettlement are required, and an explanation of why a resettlement plan as described in paragraphs 2-21 or an abbreviated plan as described in paragraph. 22 cannot be prepared by project appraisal;
- Principles and objectives governing resettlement preparation and implementation;
- A description of the process for preparing and approving resettlement plans;
- Estimated population displacement and likely categories of displaced persons, to the extent feasible;
- Eligibility criteria for defining various categories of displaced persons;
- A legal framework reviewing the fit between borrower laws and regulations and Bank policy requirements and measures proposed to bridge any gaps between them; (g) methods of valuing affected assets;
- Organizational procedures for delivery of entitlements, including, for projects involving private sector intermediaries, the responsibilities of the financial intermediary, the government, and the private developer;
- A description of the implementation process, linking resettlement implementation to civil works;
- A description of grievance redress mechanisms;
- A description of the arrangements for funding resettlement, including the preparation and review of cost estimates, the flow of funds, and contingency arrangements;
- A description of mechanisms for consultations with, and participation of, displaced persons in planning, implementation, and monitoring; and
- Arrangements for monitoring by the implementing agency and, if required, by independent monitors.

When a resettlement policy framework is the only document that needs to be submitted as a condition of the loan, the resettlement plan to be submitted as a condition of subproject financing need not include the policy principles, entitlements, and eligibility criteria, organizational arrangements, arrangements for monitoring and evaluation, the framework for participation, and mechanisms for grievance redress set forth in the resettlement policy framework. The subproject-specific resettlement plan needs to include baseline census and socioeconomic survey information; specific compensation rates and standards; policy entitlements related to any additional impacts identified through the census or survey; description of resettlement sites and programs for improvement or restoration of livelihoods and standards of living; implementation schedule for resettlement activities; and detailed cost estimate

Resettlement Action Plan

RAPs are internationally recognised good-practice vehicles to deal with compensation and mitigation related to the physical and economic displacement of people, structures and livelihood activities. They specify the required procedures and actions to identify and mitigate adverse effects, compensate losses, and provide development benefits to affected persons and communities. The scope and level of detail of the Resettlement Action Plan (RAP) will vary with the magnitude and complexity of the required resettlement. Key elements required in RAP preparation include the following:

- Description of the project, Including the identification of the project area;
- The identification of potential impacts, including:
  - The project activities that result in resettlement;
  - The zone of impact of these activities;
  - Any alternative options that can avoid and or minimize resettlement; and
  - Development of measures that will minimize the extent of the resettlement during the implementation of the project.
- The main objectives of the resettlement;
- Socioeconomic studies. The findings of socioeconomic studies to be conducted in the early stages of project preparation and with the involvement of potentially displaced people, including:
  - The results of a census survey covering -
    - current occupants of the affected area to establish a basis for the design of the resettlement program and to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance;
    - standard characteristics of displaced households, including a description of production systems, labour, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population;
    - the magnitude of the expected loss--total or partial--of assets, and the extent of displacement, physical or economic;
    - information on vulnerable groups or persons as provided for in OP 4.12, para. 8, for whom special provisions may have to be made; and
    - provisions to update information on the displaced people's livelihoods and standards of living at regular intervals so that the latest information is available at the time of their displacement.
  - Other studies describing the following:
    - land tenure and transfer systems, including an inventory of common property natural resources from which people derive their livelihoods and sustenance, non-title-based usufruct systems (including fishing, grazing, or use of forest areas) governed by local recognized land allocation mechanisms, and any issues raised by different tenure systems in the project area;
    - the patterns of social interaction in the affected communities, including social networks and social support systems, and how they will be affected by the project;
    - public infrastructure and social services that will be affected; and
    - social and cultural characteristics of displaced communities, including a description of formal and informal institutions (e.g., community organizations, ritual groups, nongovernmental organizations (NGOs)) that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.
- Legal Framework. The findings of an analysis of the legal framework including:

  - The scope of the power of eminent domain and the nature of compensation associated with it, in terms of both the valuation methodology and the timing of payment;
  - The applicable legal and administrative procedures, including a description of the remedies available to displaced persons in the judicial process and the normal timeframe for such procedures, and any available alternative dispute resolution mechanisms that may be relevant to resettlement under the project;
  - Relevant law (including customary and traditional law) governing land tenure, valuation of assets and losses, compensation, and natural resource usage rights; customary personal law related to displacement; and environmental laws and social welfare legislation;
  - Laws and regulations relating to the agencies responsible for implementing resettlement activities;
  - Gaps, if any, between local laws covering eminent domain and resettlement and the Bank's resettlement policy, and the mechanisms to bridge such gaps; and
  - Any legal steps necessary to ensure the effective implementation of resettlement activities under the project, including, as appropriate, a process for recognizing claims to legal rights to land--including claims that derive from customary law and traditional usage.
- Institutional Framework. The findings of an analysis of the institutional framework must include:
  - The identification of agencies responsible for resettlement activities and NGOs that may have a role in project implementation;
  - An assessment of the institutional capacity of such agencies and NGOs; and
  - Any steps that are proposed to enhance the institutional capacity of agencies and NGOs responsible for resettlement implementation.
- Valuation of and compensation for losses. The methodology to be used in valuing losses to determine their replacement cost; and a description of the proposed types and levels of compensation under local law and such supplementary measures as are necessary to achieve replacement cost for lost assets. Compensation means physical and/or cash compensation as well as resettlement assistance and livelihood restoration projects. The following principles of resettlement and compensation apply to physical and economic resettlement:
  - Any person who moves into the area after the cut-off date will not be eligible for compensation or resettlement assistance.
  - Only affected household structures recorded during the census and asset survey and noted as such at the time of the cut-off date are eligible for compensation.
  - Any new physical structures constructed after the cut-off date will not be replaced or compensated for.
  - Affected properties shall be compensated for at full replacement cost through the provision of similar replacement property or cash compensation where appropriate.
  - Physically displaced households will be offered adequate housing choices with security of tenure.
  - All compensation shall be provided prior to relocation.
  - Livelihoods and standard of living of affected persons shall be replaced or improved as per the commitments made in the RAP and the proposed livelihood restoration programme.
  - Land-based resettlement strategies will be applied where feasible.
  - Vulnerable households shall be provided with resettlement assistance.
  - A dispute resolution mechanism informed and linked to the complaints and grievances mechanism will be made available to the PAP to deal with compensation and resettlement grievances.
- Resettlement measures. A description of the packages of compensation and other resettlement measures that will assist each category of eligible displaced persons to achieve the objectives of the policy. In addition to being technically and economically feasible, the resettlement packages should be compatible with the cultural preferences of the displaced persons, and prepared in consultation with them.
- Site selection, site preparation, and relocation. Alternative relocation sites considered and explanation of those selected, covering:
  - Institutional and technical arrangements for identifying and preparing relocation sites, whether rural or urban, for which a combination of productive potential, locational advantages, and

other factors is at least comparable to the advantages of the old sites, with an estimate of the time needed to acquire and transfer land and ancillary resources;

  - Any measures necessary to prevent land speculation or influx of ineligible persons at the selected sites;
  - Procedures for physical relocation under the project, including timetables for site preparation and transfer; and
  - Legal arrangements for regularizing tenure and transferring titles to resettlers.

- Housing, infrastructure, and social services. Plans to provide (or to finance resettlers' provision of) housing, infrastructure (e.g., water supply, feeder roads), and social services (e.g., schools, health services); plans to ensure comparable services to host populations; any necessary site development, engineering, and architectural designs for these facilities.
- Environmental protection and management. A description of the boundaries of the relocation area; and an assessment of the environmental impacts of the proposed resettlement and measures to mitigate and manage these impacts (coordinated as appropriate with the environmental assessment of the main investment requiring the resettlement).
- Community participation. Involvement of resettlers and host communities:
  - A description of the strategy for consultation with and participation of resettlers and hosts in the design and implementation of the resettlement activities;
  - A summary of the views expressed and how these views were taken into account in preparing the resettlement plan;
  - A review of the resettlement alternatives presented and the choices made by displaced persons regarding options available to them, including choices related to forms of compensation and resettlement assistance, to relocating as individuals, families or as parts of pre-existing communities or kinship groups, to sustaining existing patterns of group organization, and to retaining access to cultural property (e.g. places of worship, pilgrimage centres, cemeteries); and
  - Institutionalized arrangements by which displaced people can communicate their concerns to project authorities throughout planning and implementation, and measures to ensure that such vulnerable groups as indigenous people, ethnic minorities, the landless, and women are adequately represented.
- Integration with host populations. Measures to mitigate the impact of resettlement on any host communities, including:
  - Consultations with host communities and local governments;
  - Arrangements for prompt tendering of any payment due the hosts for land or other assets provided to resettlers;
  - Arrangements for addressing any conflict that may arise between resettlers and host communities; and
  - Any measures necessary to augment services (e.g., education, water, health, and production services) in host communities to make them at least comparable to services available to resettlers.
- Grievance procedures. Affordable and accessible procedures for third-party settlement of disputes arising from resettlement; such grievance mechanisms should take into account the availability of judicial recourse and community and traditional dispute settlement mechanisms.
- Organizational responsibilities. The organizational framework for implementing resettlement, including identification of agencies responsible for delivery of resettlement measures and provision of services; arrangements to ensure appropriate coordination between agencies and jurisdictions involved in implementation; and any measures (including technical assistance) needed to strengthen the implementing agencies' capacity to design and carry out resettlement activities; provisions for the transfer to local authorities or resettlers themselves of responsibility for managing facilities and services provided under the project and for transferring other such responsibilities from the resettlement implementing agencies, when appropriate.
- Implementation schedule. An implementation schedule covering all resettlement activities from preparation through implementation, including target dates for the achievement of expected benefits to resettlers and hosts and terminating the various forms of assistance. The schedule should indicate how the resettlement activities are linked to the implementation of the overall project.

- Costs and budget. Tables showing itemized cost estimates for all resettlement activities, including allowances for inflation, population growth, and other contingencies; timetables for expenditures; sources of funds; and arrangements for timely flow of funds, and funding for resettlement, if any, in areas outside the jurisdiction of the implementing agencies.
- Monitoring and evaluation. Arrangements for monitoring of resettlement activities by the implementing agency, supplemented by independent monitors as considered appropriate by the Bank, to ensure complete and objective information; performance monitoring indicators to measure inputs, outputs, and outcomes for resettlement activities; involvement of the displaced persons in the monitoring process; evaluation of the impact of resettlement for a reasonable period after all resettlement and related development activities have been completed; using the results of resettlement monitoring to guide subsequent implementation.

Process Framework

A process framework is prepared when Bank-supported projects may cause restrictions in access to natural resources in legally designated parks and protected areas. The purpose of the process framework is to establish a process by which members of potentially affected communities participate in design of project components, determination of measures necessary to achieve resettlement policy objectives, and implementation and monitoring of relevant project activities (see OP 4.12, paras. 7 and 31).

Specifically, the process framework describes participatory processes by which the following activities will be accomplished:

- Project components will be prepared and implemented. The document should briefly describe the project and components or activities that may involve new or more stringent restrictions on natural resource use. It should also describe the process by which potentially displaced persons participate in project design.
- Criteria for eligibility of affected persons will be determined. The document should establish that potentially affected communities will be involved in identifying any adverse impacts, assessing of the significance of impacts, and establishing of the criteria for eligibility for any mitigating or compensating measures necessary.
- Measures to assist affected persons in their efforts to improve their livelihoods or restore them, in real terms, to pre-displacement levels, while maintaining the sustainability of the park or protected area will be identified. The document should describe methods and procedures by which communities will identify and choose potential mitigating or compensating measures to be provided to those adversely affected, and procedures by which adversely affected community members will decide among the options available to them.
- Potential conflicts or grievances within or between affected communities will be resolved. The document should describe the process for resolving disputes relating to resource use restrictions that may arise between or among affected communities, and grievances that may arise from members of communities who are dissatisfied with the eligibility criteria, community planning measures, or actual implementation. Additionally, the process framework should describe arrangements relating to the following: Operational Manual - OP 4.12, Annex A - Involuntary Resettlement Instruments.
- Administrative and legal procedures. The document should review agreements reached regarding the process approach with relevant administrative jurisdictions and line ministries (including clear delineation for administrative and financial responsibilities under the project.
- Monitoring arrangements. The document should review arrangements for participatory monitoring of project activities as they relate to (beneficial and adverse) impacts on persons within the project impact area, and for monitoring the effectiveness of measures taken to improve (or at minimum restore) incomes and living standards.

Terms of Reference: Social Baseline and Impact Assessment

<u>Note:</u> The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

Social Impact Assessment

Social Impact Assessment (SIA) is defined as "*the processes of analysing, monitoring and managing the intended and unintended social consequence, both positive and negative, of planned interventions (policies, programs, plans, project) and any social change processes invoked by those interventions*" (*IAIA, Vanclay, 2003*).

Social specialist input, within and outside of an EIA process, is essential to ensure that the positive benefits associated with development are enhanced and the negative impacts are avoided and/or mitigated. Social assessment specialist input in an EIA processes can therefore play a positive role in the development process by enriching the understanding of the social environment and communities affected by the proposed development. In this way the SIA process can enable the proposed development to become more socially sustainable. Addressing social issues, project impacts and mitigation measures is also a legal requirement in most jurisdictions.

The key tasks/activities in the SIA process should include:

- Describe and obtain an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determine the scope of the SIA:
    - Develop an area of influence detailing the anticipated extent of project impacts and benefits;
    - Identify and assess the fit of the proposed development in terms of key legislative, policy and planning requirements; and
    - On the basis of the scope, determine specialist inputs that might be required for further social baseline and impact assessment.
- Collect baseline data on the current social and economic environment and historical social trends:
    - Develop a detailed overview and understanding of the demographic profile of the community;
    - Develop an understanding of regional and local economies, with an emphasis on the way in which households in the project area sustain themselves;
    - Identify and assess the factors that contribute to the overall quality of life (social well-being) of people, not just their standard of living;
    - Identify and assess the needs of vulnerable, at risk, groups and/or ethnic minorities or indigenous peoples;
    - Identify and assess impact equity. Social assessments should seek to clearly identify which individuals, groups, organisations and communities stand to benefit from the proposed intervention and those that stand to be negatively affected. In so doing the assessment must identify and emphasize vulnerability and underrepresented groups; and
    - Assess current and potentially improved access to social services such as education, electricity, health care, housing, water and sanitation.
- Identify opportunities to leverage poverty alleviation, particularly for affected communities, as a result of the project[1]:
    - Employment opportunities for affected communities (direct and indirect);
    - Opportunities for economic growth;

[1] Large-scale energy investments can either conserve already existing structures/patterns or be used as a powerful vehicle for transforming society in a way which increases the leverage for poor people. If necessary, this aspect could be undertaken as a stand-alone study to elevate its importance and optimise the potential positive impacts.

  - Identify pre-conditions for economic growth such as vocational training, life skills, entrepreneurship, credit availability and access;
  - Opportunities to strengthen Participation, Transparency and Accountability;
  - Other opportunities (possibilities to create partnerships with private sector on or for example Vocational Training);
  - Distribution and prioritization of generated electricity, between rural/urban households, industry, public sector etc. The options that will deliver the most significant poverty alleviation should be assessed;
  - The role of off-grid networks in order to provide electricity for poor distant rural communities; and
  - Application of feed-in tariffs and other subsidies to encourage utilities and SPP to provide electricity access for the poor. Identify and assess the gender aspects of impacts and opportunities.
- Identify and collect data on the likely areas of socio-economic impact and social change related to the proposed intervention. This requires consultation with affected individuals and communities:
  - Identify and assess developmental opportunities and not merely the mitigation of negative or unintended outcomes;
  - Identify opportunities to strengthen participation, transparency and accountability; and
  - Recognise that social, economic and biophysical systems and impacts are inextricably interconnected.
- Identify and document all socio-economic impacts, through all stages of the project development and implementation process;
- Assess and document the significance of social impacts and opportunities associated with the proposed intervention:
  - Identify and assess second and higher order impacts and cumulative impacts.
- Assess alternatives and identify potential mitigation and enhancement measures;
- Ensure that mitigation and enhancement measures are captured in encompassing but practical management plans. The plans must form an integral part of the development and planning process and inform all stages of the process, from inception to decommissioning and closure;
- Develop a Gender Mainstreaming Plan[2] where necessary to raise awareness amongst relevant stakeholders, and to enable advocacy to ensure that gender issues are identified and addressed; and
- Develop a Monitoring and Evaluation Programme.

Approaches to SIA

SIA is often undertaken in a technocratic manner, relying on the interpretation of secondary data. Best practice requires a participatory approach, where stakeholders inform various stages of the baseline and impact assessment processes. The participatory approach incorporates the knowledge and experiences of individuals most affected by the proposed changes into the assessment process. In most instances the approach to identifying and assessing social impacts involves a combination of the two approaches. This highlights the importance of using experienced SIA specialists and public consultation.

Key objectives of SIA

The key objectives of the SIAs should include the following:

- Enable the authorities, project proponents, individuals, communities and organisations to understand and be in a position to identify and anticipate the potential social consequences of the implementation of a proposed policy, programme, plan or project;
- Alert communities and individuals to the proposed project and possible social impacts, while at the same time allowing them to assess the implications and identify potential alternatives;
- Alert proponents and planners to the likelihood and nature of social impacts and enable them to anticipate and predict these impacts in advance so that the findings and recommendations of the assessment are incorporated into and inform the planning and decision-making process;

[2] This plan could include measures such as the creation of partnerships with gender-sensitive NGOs and local organizations to adequately address gender aspects during project implementation, to help ensure participation of women and other vulnerable groups, and provide required knowledge for the project.

- Enable and allow affected individuals and communities to identify what they feel constitute social impacts. This is likely to vary from individual to individual and likewise between different communities;
- Ensure that the social concerns of the community and individuals are considered at the earliest, and each subsequent stage of the planning and development process, and not only after a decision has been taken; and
- Assess the improvement of social well-being (with a particular focus on developmental objectives such as poverty reduction and job creation).

Terms of Reference: Soils, land use, land capability and agriculture

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

1 Soils, land use and land capability

- Conduct a field investigation to ascertain the different soils classes, land uses and land capabilities;
- Describe and map soil types (soil forms) and characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers);
- Describe and map land uses and land capabilities;
- Spatially illustrate the soil survey points;
- Undertake a detailed survey of the topography and current drainage patterns and lines to evaluate erosion potential;
- Assess the extent of current erosion and the erosion potential of the site;
- Identify and assess all potential impacts (direct, indirect and cumulative);
- Propose mitigation measures to avoid/manage impacts on soil resources, land use and land capability; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

2 Agriculture

(To be undertaken in conjunction with the Soil Study)

- Identify agricultural activities in the project area and surrounding areas;
- Describe historical and current land use, agricultural infrastructure, as well as possible alternative land use options;
- Determine the agricultural suitability of the site;
- Determine and map the agricultural potential across the project site and zone of influence;
- Determine the erosion, vegetation and degradation status of the land;
- Identify agricultural role players in the area;
- Identify available water sources for agriculture;
- Determine and map the agricultural sensitivity to development across the site;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on current and potential agricultural land;
- Propose mitigation measures to avoid/manage impacts on agricultural activities/potential; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

Terms of Reference: Stakeholder Engagement Plan

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

Stakeholder engagement and public participation is a process of meaningful consultations/interactions between a company and identified groups of stakeholders including project affected communities, vulnerable groups and interested parties. It involves stakeholder identification and analysis, timely disclosure of project information, inclusive dissemination of and access to information, public participation, consultations and feedback, and access to a mechanism to raise and remedy grievances.

Stakeholder engagement affords stakeholders the opportunity to express their concerns, opinions and views, and for project proponents to listen, understand and take into consideration in their decision-making throughout the project lifecycle. Stakeholder engagement is an iterative and inclusive process to build and maintain constructive, long-term relationships with relevant stakeholders throughout the life of the project. The scale and complexity of a project will inform the extent and nature of the stakeholder engagement required.

Effective stakeholder engagement develops a “social license” to operate based on mutual trust, respect and transparent communication between a company and its stakeholders. It thereby improves a company’s decision-making and performance by assisting in the early and effective identification, assessment, and management of key risks, impacts, and opportunities. Constructive relationships with stakeholder assist in enhancing company credibility, avoiding costly delays and reputational risk, and managing stakeholder expectations.

Scope of a Stakeholder Engagement Plan

A Stakeholder Engagement Plan (SEP) adopts an inclusive life-of-project perspective and outlines a project’s stakeholder engagement strategy and guides its implementation.

An SEP is intended to assist the project proponent to implement and manage an effective and sustainable stakeholder engagement programme through the various stages of the project’s life cycle, including the feasibility, construction, operation and closure phases of the project. In adopting an inclusive life-of-project perspective, the SEP serves as a guide to current and future engagement to ensure that:

- Key stakeholders are identified early;
- Stakeholders are engaged pro-actively throughout the life of project;
- Key issues, interests and concerns are identified and addressed;
- Risks are identified early and managed correctly; and
- Stakeholder relationships are built, strengthened and maintained.

An SEP is informed by the lessons learned during the pre-feasibility consultation process, and is grounded in the host country legislative requirements, the principles and standards of Good International Industry Practice (GIIP), and specific project lender requirements.

The overarching goal of the SEP is to:

- Understand and contextualise the consultation and information disclosure requirements of the in-country legislation, project lender requirements, GIIP principles and standards, and applicable company policies;
- Provide guidance for stakeholder engagement such that it meets the standards of GIIP;
- Identify and prioritise key stakeholder groups that are affected, and/or able to influence the Project and its activities;
- Identify the most effective methods and structures through which to disseminate project information, and to ensure regular, accessible, transparent and appropriate consultation;
- Provide a strategy to guide the project proponent to build mutually respectful, beneficial and lasting relationships with stakeholders;
- Outline a grievance procedure allowing stakeholders to log their concerns, and a procedure to address these concerns;
- Suggest mechanisms that enable stakeholders to influence project planning and design; and
- Assist the project proponent with securing a meaningful consultation and maintaining a social license to operate throughout the project life cycle.

A typical SEP describes the following:

- **Project Description:** Brief overview of the project, social context of the project area, and motivation and objectives for the project;
- **Public Consultation Regulations and Requirements:** Including local in-country regulations and requirements, specific lender requirements, and GIIP principles and standards;
- **Previous public consultation and disclosure activities:** Summary of previous stakeholder engagement activities including type of information disseminated, details of engagement meetings, record of participants details and overview of issues raised by stakeholders;
- **Stakeholders:** Identification and categorization of stakeholders from a wide range of sectors of society for development of a project stakeholder database. Stakeholders analysis to inform the level, intensity and method of engagement with the various stakeholder groups;
- **Stakeholder Engagement Plan:** Outlining the goals of the plan, strategy for information disclosure and public consultation during the Feasibility phase (Environmental and Social Impact Assessment process), and for ongoing engagement during the construction, operational and closure phases of the project;
- **Timetable and Schedule:** A timetable detailing public consultation and information disclosure activities and methods for each of the identified stakeholder groups during the various phases of the project life cycle;
- **Resources and Responsibilities:** Indicates the human capacity and financial resources and allocated responsibilities for implementing, monitoring, advising and supporting various aspects of stakeholder engagement during the ESIA process and ongoing stakeholder engagement for the life of project;
- **Grievance Mechanism:** A transparent, accessible and accountable mechanism through which project-affected people, including communities and employees can engage the company regarding any unsatisfactory environmental and social project performance; and receive feedback on investigation and resolution of grievances; and
- **Monitoring and Reporting:** Outlines procedures for record keeping of stakeholder engagement and stakeholder issues and comments, and SEP monitoring and evaluation procedures, and identifies where and when the results of public consultation and information disclosure will be reported.

An SEP is a "living document" and must be reviewed and refined regularly by the project proponent to ensure that it aligns with their corporate objectives and approach. An SEP should ideally be reviewed and updated at least on an annual basis

Terms of Reference: Water resources

Note: The template ToRs are indicative and need to be tailored to individual project circumstances; they should be informed by the findings of the screening and scoping process and incorporate the outcome of stakeholder consultation. The ToRs may need to be elaborated upon to meet the safeguard requirements of each funder.

1 Surface water (basic)

- Undertake the following tasks:
  - Identify possible locations that could be used as suitable surface water monitoring points;
  - Map the location of existing dams, reservoirs, springs, wetlands and rivers;
  - Assess and map any potential river crossings;
  - Characterise the surface water quality by taking water quality samples based on a rigour sampling protocol; and
  - Compile a stormwater management plan.
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on surface water bodies;
- Propose mitigation measures to avoid/manage impacts on surface water bodies; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

2 Surface water (more detailed)

- Undertake the following tasks:
  - Identify possible locations that could be used as suitable surface water monitoring points;
  - Map the location of existing dams, reservoirs, springs, wetlands and rivers;
  - Assess and map any potential river crossings;
  - Characterise the surface water quality by taking water quality samples based on a rigour sampling protocol; and
  - Compile a stormwater management plan.

Assess the following as part of the surface water study:

- Surface water and drainage lines occurrence;
- Surface water characteristics (perennial, seasonal, ephemeral, effluent, influent etc.);
- Occurrence and characteristics of springs;
- Rainfall patterns, rainfall frequency, and the frequency, duration and intensity of storm events;
- Risk of flooding;
- Water quality baseline;
- Storm water run-off;
- Flow direction;
- Sediment transport and potential for erosion;
- Importance of streams in regional context and as a water supply source;
- Consider possible use of surface water for water supply during construction and operations;
- Assess risks of pollution, particularly of key water sources;
- Evaluate the potential impact of the proposed development considering the land use objectives for the area, including water resources and impact on baseline conditions;
- Trace likely cause-effect pathways to determine all potentially significant direct, indirect and cumulative impacts;

- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on surface water bodies;
- Propose mitigation measures to avoid/manage impacts on surface water bodies; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

3 Groundwater (basic)

- Undertake a hydrocensus to identify existing borehole users in the project area and surrounding area of influence;
- Sample of boreholes identified in hydrocensus to determine the baseline groundwater quality;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on groundwater;
- Propose mitigation measures to avoid/manage impacts on groundwater; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

4 Groundwater (detailed)

- Undertake a hydrocensus to identify existing borehole users in the project area and surrounding area of influence;
- Samples boreholes identified in hydrocensus to determine the baseline groundwater quality;
- Assess groundwater occurrence and characteristics;
- Determine the aquifer parameters, classification and vulnerability and importance of the aquifer in the regional context;
- Assess the recharge potential of the aquifers;
- Assess the possibility of groundwater supply during construction and operation of the project;
- Determine the possibility of groundwater contamination, flooding by groundwater and material degradation due to groundwater attack (e.g. groundwater sulphate on concrete);
- Compile a contaminant transport model to simulate the fate of any contaminants introduced into the groundwater system from operation of the site;
- Identify and assess all potential impacts (direct, indirect and cumulative) of the proposed development on groundwater;
- Trace likely cause-effect pathways to determine all potentially significant direct, indirect and cumulative impacts;
- Propose mitigation measures to avoid/manage impacts on groundwater; and
- Provide monitoring requirements and rehabilitation guidelines for all identified impacts.

Appendix G: Environmental Management Plans

Note: This Appendix contains a range of environmental and social management plans for all energy project types. These plans set out a series of control measures aimed at mitigating and managing potential key environmental and social impacts, which are a requirement of regulators and funders. It is important to adapt the management plan examples to reflect project-specific conditions.

- Coal Fired
- Geothermal
- Hydropower
- Nuclear
- Solar
- Thermal
- Transmission
- Wind

Construction and Operational Management Plan for a Coal Fired Power Project

SAPP ESMF Appendix G – Environmental Management Plan: Coal Fired

Disclaimer:

Coal fired power project

"The WBG acknowledges the global challenge of balancing energy for development with its impact on climate change and will help client countries realize affordable alternatives to coal power. The WBG will provide financial support for greenfield coal power generation projects only in rare circumstances. Considerations such as meeting basic energy needs in countries with no feasible alternatives to coal and a lack of financing for coal power would define such rare cases".

These texts are excerpt from "Toward a Sustainable Energy Future for All: Directions for the WBG's Energy Sector. This is a public document and can be found at the following link: http://documents.worldbank.org/curated/en/745601468160524040/pdf/795970SST0SecM00box377380B00PUBLIC0.pdf

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for coal fired power plants (e.g. pulverised coal, integrated gasification combined cycle (IGCC) coal plant) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific coal fired power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific coal fired power project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-Boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the coal fired power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System, the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared Environmental Health and Safety guidelines for electric power coal fired. The EHS Guidelines for coal processing (IFC, EHS Guidelines, 30 April 2007).

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the coal fired power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

<u>Note:</u> This section presents the project category of the coal fired power projects based on the likely environmental and/or social impacts. The categories of coal fired power projects are presented below for reference purposes.

There are different types of coal fired power plants namely: pulverised coal, integrated gasification combined cycle (IGCC) coal plant.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7;

b) **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document);

c) **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project; and

d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of coal fired power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for coal fired power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific coal fired power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of coal fired plant;
- Construction electricity ring main;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the coal fired power plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
    - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
    - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
    - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the coal fired power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plants structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and storm water monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for dust

- Control dust in the project area to minimize detrimental effects on sensitive environments;
- A scientifically based dust monitoring programme must as a minimum, include a schedule for dust suppression (spraying), speed limits for vehicles on unpaved roads, location and treatment of material stockpiles, the minimisation of the area disturbed at any one time and protection of exposed soil against wind erosion and a reporting mechanisms and action plan in case of excessive wind and dust conditions;
- Introduce dust abatement measures such as the use of water bowsers to wet down nearby road surfaces if necessary; and
- Minimise the area that needs to be cleared of vegetation.

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install storm water management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.6 Control measures for biodiversity

- The size of areas subjected to land clearance will be kept to a minimum;
- Only areas as instructed by the lead contractor must be cleared and grubbed;
- Cleared vegetation debris which has not been utilised will be collected and disposed of to a suitable waste disposal site. It will not be burned on site;
- No vegetation will be cut or collected off construction sites for burning or for any other purpose without the prior permission of the lead contractor;
- All vegetation not required to be removed will be protected against damage;
- No disturbing, injuring or killing of any fauna (including snakes) for any purposes; and
- The construction site will be kept clean and tidy and free from rubbish which would attract animal pest species.

4.2.7 Control measures for soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and storm water control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;
- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.8 Control measures for hazardous material

- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site;
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method; and
- Inspect and maintenance of bunded and fenced area for storage of hazardous materials, with required safety equipment.

4.2.9 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.10 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the coal fired plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.11 Control measures for noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.12 Control measures for climate change induced impacts

- Improve the design of storm water infrastructure to deal with increased intensity of storm events and associated flooding;
- Build or enlarge reservoirs, dykes, berms and spillways to reduce flooding risk which may in turn decrease coal quality and output;
- Carry out flood hazard assessments and relocate fuel storage away from flood prone areas;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability.

5 Operational Phase

Note: This section will present the operational activities of the specific coal fired power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of coal fired plant and associated infrastructure;
- Operate and maintain water and waste management systems;
- Maintenance of electricity ring;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the coal fired power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for air emissions and combustion of coal

- Use of water spray systems and/or polymer coatings to reduce the formation of fugitive dust from coal storage (e.g. on stockpiles) as feasible depending on the coal quality requirements;
- Capture of coal dust emissions from crushing / sizing activities and conveying to a baghouse filter or other particulate control equipment;
- Use of centrifugal (cyclone) collectors followed by high efficiency venturi aqueous scrubbers for thermal dryers;
- Use of centrifugal (cyclone) collectors followed by fabric filtration for pneumatic coal cleaning equipment;
- Suppression of dust during coal processing (e.g., crushing, sizing, and drying) and transfer using, for example, ware spraying systems with water collection and subsequent treatment or re-use of the collected water;
- Maintain plant boilers and stacks to meet relevant emission standards;
- Monitor emissions levels on a continuous basis; and
- Monitor ambient levels (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

5.2.2 Control measures for particulate matters, heavy oils, and heavy metals

- Appropriate technology should be selected to minimize particulate emissions as heavy metals present in coal may be released as air emissions from the coal gasification process;
- Most heavy metals can be removed through a wet scrubber; and

- Absorption technology may be required to remove mercury in coal with higher mercury content (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

5.2.3 Control measures for cooling water

- Adoption of water conservation opportunities for facility cooling systems.

5.2.4 Control measures for loss of fauna

- Keep an annual record of faunal species seen on site and deaths; and
- Implement speed control to minimise road kill.

5.2.5 Control measures for hazardous material

- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site;
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method; and
- Inspection and maintenance of bunded and fenced areas for storage of hazardous materials, with required safety equipment.

5.2.6 Control measures for materials handling and road transportation of materials

- Regular maintenance of conveyor infrastructure, enclosure hoods, transfer stations, belt turning points and belts. Road transport of material to only occur when conveyors are out of order due to breakages and maintenance;
- Any haulage by truck must include covers on the trucks to minimise dust and spillage;
- Daily inspection of the plant to identify spills;
- Spills to be cleaned up within 24 hours;
- Spills on conveyor routes to be followed up with inspection by plant environmental officer to ensure clean-up is thorough. Plant improvements may be required to prevent recurring spills;
- Ensure breakage on dust suppression infrastructure is fixed timeously;
- Ensure workshops carry stock of high frequency spares and long lead items for materials handling infrastructure;
- Ensure bunded areas and silt traps are serviced regularly; and
- Conduct the required inspections and audits as per the local waste, water and air requirements (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

5.2.7 Control measures for noise impacts

- Siting new facilities with consideration of distances from the noise sources to the receptors (e.g., residential receptors, schools, hospitals, religious places) to the extent possible. If the local land use is not controlled through zoning or is not effectively enforced, examine whether residential receptors could come outside the acquired plant boundary. In some cases, it could be more cost effective to acquire additional land as buffer zone than relying on technical noise control measures, where possible;
- Use of noise control techniques such as: using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound- absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements); applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping;
- Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines, especially where sensitive noise receptors may be present; and

- Noise propagation models may be effective tools to help evaluate noise management options such as alternative plant locations, general arrangement of the plant and auxiliary equipment, building enclosure design, and, together with the results of a baseline noise assessment, expected compliance with the applicable community noise requirements.

5.2.8 Control measures for climate change induced impacts

- Develop models to predict storms and manage extreme events;
- Conduct hazard assessments to help anticipate and manage extreme events;
- Undertake a climate risk assessment to evaluate the risks of climate variability on coal infrastructure;
- Train coal station managers to adequately incorporate climate change projections into the management and operation of coal power stations;
- Engage climate change institutions to convey climate change guidance as these institutions are well positioned to act as boundary organisations to incorporate climate change information in project management;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;
- Operate dams more efficiently to balance the interests of environmental flows, flood reduction and agriculture. The low storage capacity of most existing dams in Southern Africa suggests that they cannot be used to store major floods;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific coal fired power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
    - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
    - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
    - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
    - Sexual misconduct; and
    - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the coal fired power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise;
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;

  - Who should be informed of incidents;
  - How the incident should be reported; and
  - What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting of incidents and feedback are.

7.5 Occupational health and safety hazards of a coal fired power plant

The most significant occupational health and safety hazards occur during the operational phase of a coal processing facility and primarily include the following:

- Process Safety;
- Oxygen-Enriched Gas Releases;
- Inhalation hazards; and
- Fire and explosions.

7.5.1 Process safety

Process safety programs should be implemented due to specific characteristics, including complex chemical reactions, use of hazardous materials (e.g., toxic, reactive, flammable or explosive compounds), and multi-step reactions. Process safety management includes the following actions:

- Physical hazard testing of materials and reactions;
- Hazard analysis studies to review the process chemistry and engineering practices, including thermodynamics and kinetics;
- Examination of preventive maintenance and mechanical integrity of the process equipment and utilities;
- Worker training; and
- Development of operating instructions and emergency response procedures (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

7.5.2 Oxygen-enriched gas releases

Oxygen-enriched gas may leak from air separation units and create a fire risk due to an oxygen-enriched atmosphere. Oxygen-enriched atmospheres may potentially result in the saturation of materials, hair, and clothing with oxygen, which may burn vigorously if ignited. Prevention and control measures to reduce on-site and off-site exposure to oxygen-enriched atmospheres include:

- Installation of an automatic Emergency Shutdown System that can detect and warn of the uncontrolled release of oxygen (including the presence of oxygen enriched atmospheres in working areas) and initiate shutdown actions thus minimizing the duration of releases, and elimination of potential ignition sources;
- Design of facilities and components according to applicable safety standards, avoiding the placement of oxygen-carrying piping in confined spaces, using intrinsically safe electrical installations, and using facility wide oxygen venting systems that properly consider the potential impact of the vented gas;

- Implementation of hot work and permit-required confined space entry procedures that specifically take into account the potential release of oxygen;
- Implementation of good housekeeping practices to avoid accumulation of combustible materials;
- Planning and implementation of emergency preparedness and response plans that specifically incorporate procedures for managing uncontrolled releases of oxygen; and
- Provision of appropriate fire prevention and control equipment (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

7.5.3 Inhalation hazards

Chemical exposure in coal processing facilities is primarily related to inhalation of coal dust, coal tar pitch volatiles, carbon monoxide, and other vapours such as methanol and ammonia. Workers exposed to coal dust may develop lung damage and pulmonary fibrosis. Exposure to carbon monoxide results in formation of carboxyhemoglobin (COHb), which inhibits the oxygen-carrying ability of the red blood cells. Mild exposure symptoms may include headache, dizziness, decreased vigilance, decreased hand-eye coordination, weakness, confusion, disorientation, lethargy, nausea, and visual disturbances. Greater or prolonged exposure can cause unconsciousness and death.

Potential inhalation exposures to chemicals emissions during routine plant operations should be managed based on the results of a job safety analysis and industrial hygiene survey, and according to responsible companies' occupational health and safety guidance. Protection measures include worker training, work permit systems, use of personal protective equipment (PPE), and toxic gas detection systems with alarms (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

7.5.4 Fire and explosion hazards

Coal is susceptible to spontaneous combustion, most commonly due to oxidation of pyrite or other sulphidic contaminants in coal. Coal preparation operations also present a fire and explosion hazard due to the generation of coal dust, which may ignite depending on its concentration in air and presence of ignition sources. Coal dust therefore represents a significant explosion hazard in coal storage and handling facilities where coal dust clouds may be generated in enclosed spaces. Dust clouds also may be present wherever loose coal dust accumulates, such as on structural ledges. Recommended techniques to prevent and control combustion and explosion hazards in enclosed coal storage include the following:

- Storing coal piles so as to prevent or minimize the likelihood of combustion, including:
  - Compacting coal piles to reduce the amount of air within the pile;
  - Minimizing coal storage times;
  - Avoiding placement of coal piles above heat sources such as steam lines or manholes;
  - Constructing coal storage structures with non-combustible materials;
  - Designing coal storage structures to minimize the surface areas on which coal dust can settle and providing dust removal systems;
  - Continuous monitoring for hot spots (ignited coal) using temperature detection systems. When a hot spot is detected, the ignited coal should be removed; and
  - Access should be provided for firefighting.
- Eliminating the presence of potential sources of ignition, and providing appropriate equipment grounding to minimize static electricity hazards. All machinery and electrical equipment inside the enclosed coal storage area or structure should be approved for use in hazardous locations and provided with spark-proof motors;
- All electrical circuits should be designed for automatic, remote shutdown; and
- Installation of an adequate lateral ventilation system in enclosed storage areas to reduce concentrations of methane, carbon monoxide, and volatile products from coal oxidation by air, and to deal with smoke in the event of a fire (IFC, EHS Guidelines on Coal Processing, 30 April 2007).

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the coal fired power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
  - There are no technically or financially feasible alternatives to removal;
  - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
  - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
  - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
  - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
  - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
  - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
  - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
  - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the coal fired power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the coal fired plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits;
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensuring timeous corrective actions;
  - Performing follow ups with site management to ensure that non-conformances are corrected and recommendations are implemented within required timeframes;
  - Reporting any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensuring methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
    - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
    - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
    - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
    - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation of the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific coal fired power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company’s risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company’s compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and

- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc. are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Geothermal Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for geothermal power plants (dry steam power stations, flash steam power stations and binary cycle power stations) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific geothermal power project

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific geothermal project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the geothermal power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System, the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7) and cultural heritage (PS8. The IFC has also prepared Environmental Health and Safety guidelines for geothermal Power Plants Guideline (IFC, EHS Guidelines for Geothermal Power Plants, 30 April 2007).

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the geothermal power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the geothermal power projects based on the likely environmental and/or social impacts. The categories of geothermal powered projects are presented below for reference purposes.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7;

b) **Category B**: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document);

c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project; and

d) **Category FI**: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of geothermal power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for geothermal power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific geothermal power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of storm water control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of geothermal power plant including transmission and distributions lines;
- Construction of substations and generators;
- Installation of pump house;
- Installation of turbine hall and injection well;
- Installation of heat exchanger;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the geothermal plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired; and
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the geothermal power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plant's structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and stormwater monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for dust

- Use of loading and unloading equipment that minimizes the height of fuel drop to the stockpile to reduce the generation of fugitive dust and installing of cyclone dust collectors;
- Control dust in the project area to minimize detrimental effects on sensitive environments;
- A scientifically based dust monitoring programme must as a minimum, include a schedule for dust suppression (spraying), speed limits for vehicles on unpaved roads, location and treatment of material stockpiles, the minimisation of the area disturbed at any one time and protection of exposed soil against wind erosion and a reporting mechanisms and action plan in case of excessive wind and dust conditions;
- Introduce dust abatement measures such as the use of water bowsers to wet down nearby road surfaces if necessary; and
- Minimise the area that needs to be cleared of vegetation.

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.6 Control measures for biodiversity

- Conduct a preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions;
- If necessary compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their plant site;
- Commence vegetation clearing only after walk-through has been conducted and necessary permits obtained;
- Implement preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.;
- Minimise the extent of vegetation clearing, and do not unnecessary vegetation;
- All construction vehicles should adhere to clearly defined and demarcated roads and speed limits;
- No off-road driving to be allowed outside of the construction area;
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity;
- Remove any fauna threatened by the construction activities. This should be undertaken by the appropriately qualified environmental officer;
- Make use of suitable indigenous plant species when re-vegetating cleared areas; and
- Minimize the areas cleared for construction activities.

4.2.7 Control measures for management of soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and stormwater control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;
- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.8 Control measures for hazardous material

- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site;
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method;
- Inspect and maintenance of bunded and fenced area for storage of hazardous materials, with required safety equipment; and
- In addition, recommended measures to prevent, minimize, and control hazards associated with hazardous materials storage and handling at geothermal power plants include the use of double-walled, underground pressurized tanks for storage of pure liquefied ammonia (e.g., for use as reagent for SCR) in quantities over 100m3; tanks of lesser capacity should be manufactured using annealing processes.

4.2.9 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.10 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the geothermal plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.11 Control measures of noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.12 Control measures for climate change induced impacts

- Use air cooled systems (if cooling water is unavailable) to manage temperature increase;
- Use strengthened materials to provide extra protection to geothermal infrastructure where floods are likely to increase;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;

- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability; and

5 Operational Phase

Note: This section will present the operational activities of the specific geothermal power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of geothermal power plant facility;
- Operate and maintain water and waste management systems;
- Maintenance of pump house;
- Maintenance of turbine hall and injection well;
- Maintenance of generator;
- Maintenance of heat exchanger;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the geothermal power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for dust

- Considering technological options that include total or partial re-injection of gases with geothermal fluids within the context of potential environmental impacts from alternative generating technologies together with other primary factors, such as the fit of the technology to the geologic resource and economic considerations (e.g. capital and operation / maintenance costs);
- When total re-injection is not feasible, venting of hydrogen sulfide and non-condensable volatile mercury if, based on an assessment of potential impact to ambient concentrations, pollutant levels will not exceed applicable safety and health standards; and
- If necessary, use of abatement systems to remove hydrogen sulfide and mercury emissions from non- condensable gases. Examples of hydrogen sulfide controls can include wet or dry scrubber systems or a liquid phase reduction / oxidation system, while mercury emissions controls may include gas stream condensation with further separation or adsorption methods (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.2 Control measures for water resources

- Elaboration of a comprehensive geological and hydrogeological model including overall geological, structural and tectonic architecture, reservoir size, boundaries, geotechnical and hydraulic host rock properties;

- Completion of a hydrogeologic and water balance assessment during the project planning stage to identify hydraulic interconnections between the geothermal extraction and reinjection points and any sources of potable water or surface water features;
- Isolation of steam producing sources from shallower hydrologic formations which may be used as sources of potable water through careful site selection and properly designed and installed well casing systems; and
- Avoiding negative impacts on surface water by introducing strict discharge criteria and appropriate means to bring water quality and temperature to acceptable standards (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.3 Control measures for drilling fluids and cuttings

- Recovery and storage of oil-based drilling fluids and cuttings in dedicated storage tanks or sumps, lined with an impervious membrane, prior to treatment (e.g. washing), recycling, and / or final treatment and disposal;
- Reuse of drilling fluid, where feasible;
- Removal of tanks or sumps to avoid the present or future release of oil-related materials into soil and water resources and treatment / disposal of contents as a hazardous on non-hazardous waste depending on its characteristics;
- Disposal of water-based drilling fluids into the bore hole following toxicity assessment. Water-based cuttings are typically reused if they are non-toxic (e.g. as construction fill) or disposed of in a landfill facility; and
- During acid treatment of wells, use of leak-proof well casings to a depth appropriate to the geological formation in order to avoid leakage of acidic fluids to groundwater (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.4 Control measures for spent geothermal fluids

- Carefully evaluate the potential environmental impacts of geothermal fluid discharges depending on the selected cooling system; and
- If facilities do not re-inject all geothermal fluids underground, effluent discharge quality should be consistent with the receiving water body. This may include adjusting effluent temperature according to local regulations or a site-specific standard based on potential impacts to the receiving water body. If elevated heavy metal concentrations are found in geothermal fluids, due diligence has to be exercised for their discharge into natural water bodies which may necessitate construction and operation of complex and costly treatment facilities; Where reinjection is the selected alternative, potential for contamination of groundwater should be minimized by installation of leak-proof well casings in the injection wells to a depth to the geological formation hosting the geothermal reservoir.

Opportunities for reuse of reject geothermal fluids should be considered, including:

- Use of binary power generation technology;
- Use in downstream industrial processes if reject water quality (including levels of total and dissolved heavy metals) is consistent with the quality requirements of the intended use. Examples of downstream uses include heating applications such as greenhouses, aquaculture, space heating, food / fruit processing, and recreational use for hotels / spas, among others; and
- Final discharge of used fluids according to the treatment and discharge requirements of the applicable activity, if any, and consistent with the receiving water body use (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.5 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;

- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve;
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area; and
- In addition, recommended measures to prevent, minimize, and control hazards associated with hazardous materials storage and handling at geothermal power plants involves proper on-site storage and containment before final treatment and disposal at an appropriate waste facility. If the sludge is of acceptable quality without significant leachable metals content (i.e. is a non-hazardous waste), on-site or off-site reuse as backfill may be considered as a potential disposal option. Recoverable solids such as sulfur cake should be recycled by third parties to the extent feasible. The disposal pathways will have to be determined initially by appropriate chemical analyses of the precipitates, which should be periodically (e. g. annually) repeated to accommodate for potential geochemical variations and resulting impacts on waste quality (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.6 Control measures for well blowouts and pipeline failures

- Regular maintenance of wellheads and geothermal fluid pipelines, including corrosion control and inspection; pressure monitoring; and use of blowout prevention equipment such as shutoff valves; and
- Design of emergency response for well blowout and pipeline rupture, including measures for containment of geothermal fluid spills (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.7 Control measures for water consumption and extraction

- Assessing hydrological records for short and long-term variability of streams serving as source water, and ensuring critical flows are maintained during low flow periods so as to not obstruct passage of fish or negatively impact aquatic biota; and
- Monitoring temperature differential of effluent and receiving water bodies to comply with local regulations respecting geothermal discharge (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

5.2.8 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.9 Control measures for noise impacts

- Principal sources of noise in geothermal power plants include the turbine generators and auxiliaries; boilers and auxiliaries, such as coal pulverizers; reciprocating engines; fans and ductwork; pumps; compressors; condensers; precipitators, including rappers and plate vibrators; piping and valves; motors; transformers; circuit breakers; and cooling towers. Geothermal power plants used for base load operation may operate continually while smaller plants may operate less frequently but still pose a significant source of noise if located in urban areas. Recommend measures to prevent, minimize, and control noise from geothermal power plants include:

- Siting new facilities with consideration of distances from the noise sources to the receptors (e.g., residential receptors, schools, hospitals, religious places) to the extent possible. If the local land use is not controlled through zoning or is not effectively enforced, examine whether residential receptors could come outside the acquired plant boundary. In some cases, it could be more cost effective to acquire additional land as buffer zone than relying on technical noise control measures, where possible;
- Use of noise control techniques such as: using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound- absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements); applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping;
- Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines, especially where sensitive noise receptors may be present; and
- Noise propagation models may be effective tools to help evaluate noise management options such as alternative plant locations, general arrangement of the plant and auxiliary equipment, building enclosure design, and, together with the results of a baseline noise assessment, expected compliance with the applicable community noise requirements.

5.2.10 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;
- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.11 Control measures for climate change induced impacts

- Develop models to predict storms and manage extreme events;
- Conduct hazard assessments to help anticipate and manage extreme events;
- Undertake a climate risk assessment to evaluate the risks of climate variability on geothermal infrastructure;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;
- Operate dams more efficiently to balance the interests of environmental flows, flood reduction and agriculture. The low storage capacity of most existing dams in Southern Africa suggests that they cannot be used to store major floods;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific geothermal power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.;

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the geothermal power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise; and
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

  - o How the incident should be reported; and
  - o What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - o Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - o Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - o Who should be informed of an incident;
  - o How should incidents should be reported; and
  - o What the time limits for reporting incidents and feedback are.

7.5 Occupational health & safety hazards of a geothermal power plant

General safety procedures will be prescribed for specific types of potential hazards associated with day-to-day operation of a geothermal power plant. The procedures will address ways to eliminate or control

Any hazard. In addition, the following health and safety impacts are of particular concern during operation of geothermal power plants:

- Geothermal gases;
- Exposure to hydrogen sulfide gas;
- Heat;
- Infrastructure safety; and
- Noise.

7.5.1 Geothermal gases

- Installation of hydrogen sulfide monitoring and warning systems. The number and location of monitors should be determined based on an assessment of plant locations prone to hydrogen sulfide emission and occupational exposure;
- Development of a contingency plan for hydrogen sulfide release events, including all necessary aspects from evacuation to resumption of normal operations; Provision of facility emergency response teams, and workers in locations with high risk of exposure, with personal hydrogen sulfide monitors, self-contained breathing apparatus and emergency oxygen supplies, and training in their safe and effective use;
- Provision of adequate ventilation of occupied buildings to avoid accumulation of hydrogen sulfide gas;
- Development and implementation of a confined space entry program for areas designated as ‘Confined Spaces’; and
- Providing workers with a fact sheet or other readily available information about the chemical composition of liquid and gaseous phases with an explanation of potential implications for human health and safety (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

7.5.2 Hydrogen sulfide

- Siting of potential significant emissions sources with consideration of hydrogen sulfide gas exposure to nearby communities (considering key environmental factors such as proximity, morphology and prevailing wind directions);
- Installation of a hydrogen sulfide gas monitoring network with the number and location of monitoring stations determined through air dispersion modeling, taking into account the location of emissions sources and areas of community use and habitation;

- Continuous operation of the hydrogen sulfide gas monitoring systems to facilitate early detection and warning; and
- Emergency planning involving community input to allow for effective response to monitoring system warnings (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

7.5.3 Heat

Occupational exposure to heat occurs during operation and maintenance of combustion units, pipes, and related hot equipment. Recommended prevention and control measures to address heat exposure at geothermal power plants include:

- Reducing the time required for work in elevated temperature environments and ensuring access to drinking water;
- Shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc.; and
- Use of personal protective equipment (PPE) as appropriate, including insulated gloves and shoes; Implementing appropriate safety procedures during the exploratory drilling process (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

7.5.4 Infrastructure safety

- Placement of access deterrents, such as fences and warning signs, to prevent access and warn of existing hazards;
- Minimizing the length of necessary pipeline systems; Consideration of the feasibility of subsurface pipelines or heat shields to prevent public contact with hot geothermal pipelines;
- Managing closure of infrastructure such as pipelines and access roads, including: cleaning, disassembly, and removal of equipment; analysis of soil quality with clean-up where warranted; re-vegetation of site and blockade and reclamation of access roads where necessary; and
- Managing closure of well heads including sealing well with cement, removing the well head, and backfilling depression around the well head, as necessary (Environmental, Health, and Safety Guidelines for Geothermal Power Plants Guideline, 30 April 2007).

7.5.5 Noise

Noise sources in geothermal facilities are mainly related to well drilling, steam flashing and venting. Other sources include equipment related to pumping facilities, turbines, and temporary pipe flushing activities. Temporary noise levels may exceed 100 dBA during certain drilling and steam venting activities. Noise abatement technology includes the use of rock mufflers, sound insulation, and barriers during drilling, in addition to silencers on equipment in the steam processing facility.

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the geothermal power plant. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
  - There are no technically or financially feasible alternatives to removal;
  - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
  - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
  - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
  - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
  - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
  - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
  - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
  - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the geothermal power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the geothermal plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits; and
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensures timeous corrective actions;
  - Performs follow ups with site management to ensure that non-conformance is corrected and recommendations are implemented within required timeframes;
  - Report any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensures methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;

- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific geothermal power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and

- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc. are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Hydro Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for hydro power plants (e.g. impoundment, diversion and pumped storage hydro power plant) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific hydro power project

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific hydro project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the hydro power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

The World Bank has an operational policy on dams that where developed in September 1996. This policy outlines the safety requirements for the construction of new dams as well as existing dams. The policy acknowledges that in the life of any dam, the owner has full responsibility for the safety of the dam, irrespective of its funding sources or construction status. As there are serious consequences if a dam does not function properly or fails, the Bank is concerned about the safety of new dams it finances and existing dams on which a Bank-financed project is directly dependent.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people’s livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China’s overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP’s). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared several guidance notes for some of the energy generation types, e.g. thermal, wind and transmission.

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the hydro power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the hydro power project based on the likely environmental and/or social impacts. The categories of hydro powered projects are presented below for reference purposes.

There are three types when defining hydro powered plants, they are namely: impoundment, diversion and pumped storage.

In terms of OP 4.01 paragraph 8, the World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in paragraph 7;

b) **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document);

c) **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project; and

d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of hydro power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for hydro power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific hydro power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of hydro power plant;
- Installation of a transformer;
- Installation of storage tank;
- Installation of turbines and generators;
- Installation of switchgear and protection;
- Installation of fire management system;
- Installation of communications system;
- Construction of a battery storage facility; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the Hydro plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the hydro power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- The responsible company the lead contractor must establish and implement a site construction waste and wastewater management plan to avoid water impacts from construction activities. The plan should include regular refresher training sessions for construction workers as pertains to safe and proper storage, handling, use, clean up, and disposal of oils, fuels and other chemicals and the implementation of a comprehensive spill response plan including equipment and training;
- Detailed and effective design of spillways to manage the temperature and oxygenation of releases to the river including preventing anoxic discharges;
- The construction worker's camp must be located away from the steep river banks;
- Install treatment facilities and/or oil/water separators to remove oil and grease from drainage water prior to discharge to adjacent water courses;
- Install secondary containment measures in areas where fuels, oils, lubricants etc. are stored and loaded or unloaded, including filling points. All contractor fuel storage facilities must be bunded on an impermeable base to ensure that potential leakages from containers are contained;
- In case of oil pollution, sedimentation and siltation, the contractor should halt construction activities immediately and recover the pollutant before it reaches any receiving water sources;
- The contractor must avoid washing construction equipment in the river;
- Wastewater treatment facilities must be installed to treat wastewater from the workers' accommodation and other construction facilities;
- Provide disposal facilities for wastes at the campsite and properly allocate the dumping site; and
- Undertake regular water quality monitoring in the reservoir, and water body downstream to include dissolved oxygen, nutrients, pesticides and nuisance plants.

4.2.4 Control measures for geo hydrological and hydrological impacts

- To prevent sedimentation of streams during construction of the weir and low pressure pipeline, the contractor should construct barriers (sediment traps) along the low pressure pipeline (between the pipeline and the river) to prevent and/or arrest any falling debris, soil or rocks from reaching the river;
- Disposal of cut soil and all the debris trapped by the sediment traps should be undertaken outside wetlands, road reserves and fragile ecosystems;
- There should be controlled clearance of vegetation, and this should be strictly limited to only the footprint of the project;
- Disturbed areas should be rehabilitated using suitable indigenous vegetation. This vegetation should be planted along the drainage channels to reduce the scouring effect of water;
- The lead contractor should manage operations to avoid rapid fluctuations in downstream flow; and
- There should be periodic monitoring of water flow downstream.

4.2.5 Control measures for interruption of stream flow

- Streamflow should be maintained at all times, as far as possible, with the creation of diversionary channels; and
- Any diversionary channel needs to be located so as to divert the flow sufficiently far from the construction site to be free of construction contamination (particularly sediment runoff, cement and oil residues). It should also be accessible to the fish fauna presently occupying the area, to minimize disruption to migratory and non-migratory movement up and down stream.

4.2.6 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;

- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.7 Control measures for biodiversity

- Conduct a preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions;
- If necessary, compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Commence vegetation clearing only after walk-through has been conducted and necessary permits obtained;
- Implement preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.;
- Minimise the extent of vegetation clearing, and do not unnecessary vegetation;
- All construction vehicles should adhere to clearly defined and demarcated roads and speed limits;
- No off-road driving to be allowed outside of the construction area;
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity;
- Remove any fauna threatened by the construction activities. This should be undertaken by the appropriately qualified environmental officer;
- Make use of suitable indigenous plant species when re-vegetating cleared areas;
- Minimize the areas cleared for construction activities; and
- Specific regulations are needed for the control of contractors and for the management of workers, ensuring that they do not engage in ecologically harmful practices either during their duties or during their free time. Responsibility for this must rest with the contractors during construction and the hydro plant operators during operation.

4.2.8 Control measures for aquatic ecology

- During construction, aquatic fauna habitat disturbance should be minimised by restricting the project activities to only the specific areas of the river required;
- Implement soil erosion control measures and reduce soil disturbance during construction activities by constructing sediment traps;
- Install and regularly empty sediment traps in surface drains in and around roads and construction areas;
- Disposal of cut soil should be undertaken outside fragile ecosystems and water sources downstream, under the direction of the lead contractor who should approve disposal sites;
- Design and implement a compensational flow regime during operation. This amounts to 200 l/s and / or 15% of incoming flow;
- There should be periodic monitoring of water flow, quality and temperature downstream to ascertain the right aquatic ecosystem conditions;
- Conduct a periodic monitoring of water flow, quality and temperature downstream to ascertain the extent to which aquatic ecosystem conditions may have been changed; and
- The construction of fish ladders across the weir is not considered to be necessary. However, the riverbed on the downstream side of the weir should be filled with large rocks immediately following construction so that the level difference on the downstream side of the weir is made as small as possible, to allow upstream fish migration.

4.2.9 Control measures for soil and land capability

- Install soil erosion control structures like gabions and check dams;
- Install and regularly empty sediment traps in surface drains of the construction areas. The contractor should construct sediment traps along the pipeline route on the steep slopes to prevent and/or arrest any falling debris, soil or rocks from reaching the river and other smaller watercourses;
- Proper design for storm water drainage facilities and maintenance during the construction phase are critical for mitigation;
- Disposal of excavated/cut soil should be undertaken outside fragile ecosystems and water sources, under the direction of the resident engineer who should approve disposal sites;
- Construction during heavy rains should be avoided as much as is possible as water logged soils are easily eroded;
- Labour-intensive methods of excavation should be applied on the steep slopes, where necessary, to minimise disturbance of the soil by construction machinery. This may need to be applied particularly on very steep slopes;
- Revegetation of areas where construction has been completed must happen as early as possible and progressively as the construction front for the low-pressure pipeline moves; and
- Soil erosion control measures that have been installed during construction must be maintained and/or altered during operation to ensure that they remain effective.

4.2.10 Control measures for hazardous material

- Construct a bunded and fenced area for storage of hazardous materials, using the required safety equipment;
- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site; and
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method.

4.2.11 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.12 Control measures for noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.13 Control measures for climate change induced impacts

- Construct strengthened dams for hydropower station fortification to manage increased water capacity due to glacier melt;
- Construct improved de-siltation gates and hydrological forecasting to manage precipitation increases and increased mountain erosion;
- Construct dams with increased dam height and/or build small dams upstream to manage precipitation increase. Construction or augmentation of water storage reservoirs can also be considered;
- Construct and adjust the number and type of turbines to be more suited to expected water flow rates associated with extreme precipitation events;
- Construct and adjust canals or tunnels to better handle expected changes in water flows associated with extreme precipitation events;
- Construct resilient hydropower infrastructure to manage increased storm and cyclone intensity and/or frequency;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability.

5 Operational Phase

Note: This section will present the operational activities of the specific hydro power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of hydro plant facilities;
- Operate and maintain water and waste management systems;
- Servicing and maintenance of transformers, turbines and generators;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the hydro power project should be featured

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for water quality

- Institute and utilise appropriate water saving measures and technologies to minimise water use;
- Minimum disturbance to be caused to existing topography during preconstruction and construction;
- Water discharging to the environment during all project phases (and to include water and sewage treatment works, as well as water from washing of panels) to comply with relevant water quality standards;
- Ensure legislative requirements are met for sanitation;
- Clean and dirty water is to be separated at point source;
- Place hessian/geofabric attached to rows of stakes to prevent sediment washing downstream of the site during operation;
- Review the results of monitoring of inflows, outflows, and water levels;
- Review the results of monitoring and effects on any nearby aquifers or water supply facilities;
- Implement dam safety monitoring program; and
- Regulation of water flows and the retention time will reduce any potential salinization effects of evaporation.

5.2.2 Control measures for high dam reservoirs

- Implement artificial desertification measures as it is one of the effective measures for maintaining a good quality of water in a reservoir which undergoes stratification.

5.2.3 Control measures for river restoration

- Ensure there are changes in the released flow, at different time scales, in order to reduce the alteration of the natural discharge regime; it has to be underlined that this is not limited to minimum flow conditions;
- Adoption of correct protocols for the mobilisation of fine sediments accumulated in the reservoir, including appropriate timing and suspended solids concentration (with the help of real time measures), mechanical procedures, adaptation to morphology downstream and to local average conditions; and
- Installation of screens at the inlets and of fish-friendly turbines in order to reduce mortality of fish moving downstream.

5.2.4 Control measures for upstream and downstream changes

- Improved watershed management is necessary to minimize potential sediment deposition in the reservoir; and
- Monitor flows in the river basin.

5.2.5 Control measures for stormwater

- Discharge stormwater and any run-off generated by the hard surfaces into retention swales or areas with rock rip-rap. These energy dissipation structures should be placed in manner that flows are managed prior to being discharged back into the natural waters courses, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained;
- Regularly inspect chemical storage containers to ensure early detection of leaks;
- Maintain emergency plans in case of spillages onto road surfaces and into watercourses;
- Maintain structure along all roads and other hardened surfaces that redirect water flow and dissipate any energy in the water which may pose an erosion risk;
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques;
- Maintain structures (e.g. gabions and Reno mattresses) to avoid and/or minimise erosion and sedimentation into water bodies and re-vegetate of any disturbed riverbanks;
- Inspection and maintain the erosion protection berm and low flow diversion channel;
- Inspection and maintain of contact and non-contact water diversion channels to divert stormwater from and around infrastructure and facilities;
- Inspection and maintenance stormwater management system; and
- Compile a comprehensive storm water management plan. This plan should include appropriate means for the handling of stormwater within the site, e.g. separate clean and dirty water streams around the plant, install stilling basins to capture large volumes of run-off, trapping sediments and reduce flow velocities as well as appropriate drainage around the site.

5.2.6 Control measures for protection of biodiversity

- Harvesting of plant material or other damage to fauna and flora must be prevented and avoided, and disciplinary measures including dismissal to be put in place;
- Implementation and ongoing refinement of operational protocols for downstream flows and sediment releases;
- Management of dam and downstream shorelines to replicate as far as possible natural riparian ecosystem conditions;
- Management of biomass / invasive species in reservoir area;
- If necessary, compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Regularly monitor for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility to control the potential spread of invasive alien plant species;
- Clear alien plants using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible;

- Prohibit the imposition of barriers (hydropower dams and other structures) from the headwaters to the ocean of at least one river within each system to ensure that a full sequence of habitats and migratory routes is protected in each river. Any human imposed barriers already in place should be removed or bypassed with fish passage devices;
- Define zones of influence adjacent to the intact rivers in which activities that might impact the aquatic environments of the intact rivers are strictly controlled;
- Prohibit mining in the river channel and river banks for the length of the intact river and its side branches and feeder streams within the zones of influence; and
- Impose strict controls on terrestrial mining in of the zones of influence to prevent pollutants (e.g. cyanide & mercury) and sediments entering the intact river.

5.2.7 Control measures for aquatic biodiversity

- In order to minimize the impact of sedimentation on aquatic life in the river, polyethylene liners or liners of similar nature should be used to line the dam;
- Sediment curtains or silt screens supported on a boom should be deployed at the site of any river bank or river bed excavation to prevent disturbed sediments from entering the stream flow;
- River bed and river bed excavation should be limited to the dry season as far as possible;
- Washing of aggregate should not be conducted in the river, and wash-water should be stored in sedimentation ponds to allow for settling and reuse;
- In order to reduce the impacts of sedimentation on aquatic life downstream, the responsible company should notify the local authorities when they intend to carry out flushing activities; and
- The creation of numerous small shallow pools within the same reservoir bank area. These pools should be appropriately spaced on both banks and would recreate breeding sites for the majority of the aquatic fauna. Vegetation should not be cleared around or in this pool.

5.2.8 Control measures for soil or water contamination

- Ensure improved watershed management;
- Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill;
- Regularly train staff on how to deal with spills and provide the necessary equipment;
- It is recommended that inspection of the reservoir bed takes place as a regular maintenance operation and that flushing take place as required;
- Carefully controlled reservoir flushing is necessary to mitigate any downstream sedimentation impacts;
- Soil conservation activities and control of land use in the watershed can mitigate the sedimentation of the reservoir. Any sediment flushing, however minor, will supply downstream waters with sediment, and should be carefully regulated and monitored;
- Maintain bunds around hydrocarbon and chemical storage areas as well as refuelling areas where these exist on site; and
- Implement soil conservation activities and control of land use in the watershed should mitigate the sedimentation of the reservoir. Any sediment flushing, however minor, will supply downstream waters with sediment, regulated and monitored.

5.2.9 Control measures for dam failure

- Dams will naturally deteriorate over time, but the rate and extent of deterioration is unique to each dam. However, routine preventative maintenance is essential to ensure that deterioration is immediately observed and where possible repaired;
- Prepare a dam inspection and maintenance plan;
- Performance monitoring instrumentation should be installed in the dam and should include vibrating piezometers for measuring water pressure and survey instruments for measuring movements; and
- A draining and inspection gallery should be constructed in the body of the dam if a Reinforced Concrete Dam is built, and should include seepage measuring weirs. The spillway of the dam should be designed to accommodate the Probable Maximum Flood (PMF) and provide controlled routing for a flood with a 100-year return period.

5.2.10 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;
- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve; and
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area.

5.2.11 Control measures for management of waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- Ensure compliance of relevant waste management as per in country and other relevant standards;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using; and
- Inspection and maintain the waste management facilities.

5.2.12 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.13 Control measures for noise impacts

- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

5.2.14 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;

- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.15 Control measures for climate change induced impacts

- Develop improved hydrological forecasting techniques and adaptive management operating rules to address extreme precipitation and temperature events as well as extreme events associated with climate changes impacts;
- Plant trees upland to reduce floods, erosion, silting, and mudslides;
- Develop and implement sustainable reservoir management and improve energy output by adapting to changes in rainfall or river flow patterns;
- Conduct a climate risk assessment to evaluate the risks of climate variability on hydropower infrastructure;
- Engage hydropower-supporting institutions to convey climate change guidance as these institutions are well positioned to act as boundary organisations to incorporate climate change information in project management;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;
- Operate dams more efficiently to balance the interests of environmental flows, flood reduction and agriculture. The low storage capacity of most existing dams in Southern Africa suggests that they cannot be used to store major floods;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific hydro power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and

- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
    - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
    - Sexual misconduct; and
    - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
    - Location for lodging of grievances;
    - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
    - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
    - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the hydro power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise;
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

  - How the incident should be reported; and
  - What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and;
  - What the time limits for reporting incidents and feedback are.

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the hydro power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
    - There are no technically or financially feasible alternatives to removal;
    - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
    - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
    - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
    - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
    - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
    - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
    - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
    - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the hydro power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the Hydro plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits;
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensuring timeous corrective actions;
  - Performing follow ups with site management to ensure that non-conformances are corrected and recommendations are implemented within required timeframes;
  - Reporting any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensuring methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant site;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation of the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific hydro project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and
- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
  - A daily site register;
  - A non-conformance register (NCR); and
  - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Nuclear Power Project

Disclaimer

Nuclear power project

"The WBG will not finance nuclear power generation or provide specific technical assistance for its assessment and development because safety of nuclear facilities and non-proliferation are not in the WBG's areas of expertise, nor will the WBG build internal capacity in matters related to nuclear power generation".

These texts are excerpt from "Toward a Sustainable Energy Future for All: Directions for the WBG's Energy Sector. This is a public document and can be found at the following link: http://documents.worldbank.org/curated/en/745601468160524040/pdf/795970SST0SecM00box377380B00PUBLIC0.pdf

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for nuclear power plants is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific nuclear power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific nuclear power project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa’s infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-Boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organisation’s commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the nuclear power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System, the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and

development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6) ; indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared several guidance notes for some of the energy generation types, e.g. thermal, wind and transmission.

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the nuclear power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the nuclear power project based on the likely environmental and/or social impacts. The categories of nuclear powered projects are presented below for reference purposes.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7;

b) **Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document);

c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project; and

d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of nuclear power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for nuclear power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific nuclear power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of nuclear power plant;
- Installation of steam turbines and generators;
- Installation of cooling system;
- Installation of feed water pump;
- Installation of emergency power supply;
- Installation of safety valves;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the nuclear power plants should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the nuclear power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plants structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- In the case of a nuclear power station site the stormwater management system for the nuclear power island area itself needs to be designed in accordance with the standards specified by the local water department (In the event of no local requirements, then Good International Industry Practice will be followed).

4.2.4 Control measures for dust

- Develop Air Quality Management Plan;
- Control dust in the project area to minimize detrimental effects on sensitive environments;
- A scientifically based dust monitoring programme must as a minimum, include a schedule for dust suppression (spraying), speed limits for vehicles on unpaved roads, location and treatment of material stockpiles, the minimisation of the area disturbed at any one time and protection of exposed soil against nuclear erosion and a reporting mechanisms and action plan in case of excessive nuclear and dust conditions;
- Introduce dust abatement measures such as the use of water bowsers to wet down nearby road surfaces if necessary; and
- Minimise the area that needs to be cleared of vegetation.

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.6 Control measures for biodiversity

- Conduct a preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions;
- If necessary, compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Commence vegetation clearing only after walk-through has been conducted and necessary permits obtained;
- Implement preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.;
- Make every effort to minimise the impact where rare flora/ habitat stands to be lost;
- Minimise areas to be cleared as much as reasonable, whether off-site or on-site; and rehabilitate affected areas, where possible and appropriate, as soon as reasonably possible after it had been impacted; for 'normal' indigenous (local) ecological function to be retained / restored;
- Consult with an appropriately qualified specialist (e.g. botanist) well in advance of construction to undertake the planning and management for collection of scientific material and floral specimen search and rescue (and where appropriate establishment of and/or safe keeping of specimens in a nursery for rehabilitation purposes);
- Facilitate collection of scientific material and information before and during site clearance for deposit in museums, herbaria, etc. by collecting specimens for the benefit of deriving biological material that will otherwise be totally lost during site clearance;
- Keep retained or re-established indigenous (local) vegetation low by regular mowing to provide habitat for small and fossorial animals and invertebrates, rather than clearing vegetation altogether, in such limited areas where this is necessary; e.g. within areas where high vegetation cannot be tolerated for security and safety reasons;
- Undertake, for each phase of site clearing and construction within natural veld, a search and rescue operation to identify and safely rescue and relocate all plants which are either extremely rare (i.e. Endangered or Critically Endangered) or which could be used in site rehabilitation or released under controlled conditions for resource utilisation;
- Monitor site clearing to ensure that where possible all Red Data species affected by development are relocated or successfully grown on in a nursery and returned to the wild;
- Address all flora related issues identified during the abovementioned rehabilitation and flora monitoring; and
- Where rare fauna (vertebrate and invertebrate) stands to be lost, a tangible effort should be made to minimise the impact, bearing in mind that rescue and relocation of invertebrate species is generally not recommended as an option due to uncertainties and low success rate.

4.2.7 Control measures for soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;
- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;

- Store topsoil excavated from the site. This should be stored separate from nuclear rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.8 Control measures for hazardous material

- Construct a bunded and fenced area for storage of hazardous materials, using the required safety equipment;
- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site; and
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method.

4.2.9 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.10 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the nuclear plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.11 Control measures for noise impacts

- Onshore construction noise should be limited to protect people living nearby;
- Noise-producing activities include blasting, piling, construction of roads and turbine foundations, and the erection of the turbines themselves;
- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.12 Control measures for climate change induced impacts

- Increase volume of water treatment works and/or develop new water sources to counter the effects of precipitation increase or decrease due to climate change;
- Build concrete-sided buildings instead of metal to counter the effects of extreme events;
- Build higher structural standards for new or renovated buildings to counter the effects of extreme events;
- Build embankments, dams, dykes, reservoirs, polders, ponds, relocated flood defence barriers, and higher channel capacity to address issues related to sea-level rise;
- Place fuel storage facilities inland and away from the shore;
- Concentrate investment in locations where temperatures are likely to be cooler;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods; and
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability.

5 Operational Phase

Note: This section will present the operational activities of the specific nuclear power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of nuclear plant facilities;
- Operate and maintain water and waste management systems;
- Servicing and maintenance of nuclear panels;
- Maintenance of steam turbines and generators;
- Maintenance of cooling system;
- Maintenance of feed water pump;
- Maintenance of emergency power supply;
- Maintenance of safety valves;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the nuclear power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measure for water quality

- Develop and maintain an overall site Water Management Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;

- In the case of a nuclear power station site the stormwater management system for the nuclear power island area itself needs to be designed in accordance with the standards specified by the local water department (In the event of no local requirements, then Good International Industry Practice will be followed);
- Institute and utilise appropriate water saving measures and technologies to minimise water use;
- Minimum disturbance to be caused to existing topography during preconstruction and construction;
- Water discharging to the environment during all project phases (and to include water and sewage treatment works, as well as water from washing of panels) to comply with relevant water quality standards;
- Ensure legislative requirements are met for sanitation;
- Clean and dirty water is to be separated at point source; and
- Place hessian/geofabric attached to rows of stakes to prevent sediment washing downstream of the site during operation.

5.2.2 Control measures for the protection of biodiversity

- Keep retained or re-established indigenous (local) vegetation low by regular mowing to provide habitat for small and fossorial animals and invertebrates, rather than clearing vegetation altogether, in such limited areas where this is necessary; e.g. within areas where high vegetation cannot be tolerated for security and safety reasons;
- Monitor habitat where Red Data species affected by construction have been relocated;
- Monitor habitat (e.g. maintain fire frequency) to ensure optimal habitat conditions for Red Data species and adapt management practices as necessary;
- Address all flora related issues identified during the abovementioned flora monitoring;
- Continue to develop, manage and maintain owner-controlled areas outside the nuclear power station footprint as a nature conservation area (nature reserve);
- Provide access for scientific research and for recreation to nature conservation areas within the owner-controlled area;
- Incorporate additional properties that are purchased into the protected area;
- Continue to implement and maintain the rehabilitation plan;
- Monitor the effectiveness of rehabilitation on rehabilitated terraces and take action to address poor rehabilitation e.g. by addressing erosion and poor establishment of seed;
- Investigate the causes of poor rehabilitation success (e.g. Poor soil preparation, lack of sufficient topsoil, lack of fertilisation, lack of mulching, etc.) and address appropriately;
- If necessary, compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their plant site;
- Remove to a safe location any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities;
- Regularly monitor for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility to control the potential spread of invasive alien plant species;
- Clear alien plants using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible; and
- Training and awareness programmes for employees on the significance of the ecology to be carried out at regular intervals.

5.2.3 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;

- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve; and
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area.

5.2.4 Control measures for management of waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- Ensure compliance of relevant waste management as per in country and other relevant standards;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered landfill site;
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using; and
- Inspection and maintain the waste management facilities.

5.2.5 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.6 Control measures for noise impacts

- Noise generated from nuclear energy facilities tends to increase with the speed of the nuclear, as does overall background noise due to the friction of air over existing landscape features. Increased nuclear speeds may also mask the noise emitted by the nuclear energy facility itself, and nuclear speed and direction may affect the direction and extent of noise propagation. The application of noise guideline values and the assessment of background levels should therefore take these factors into consideration. It is considered good practice to undertake noise compliance testing when the project becomes operational to verify the modelled noise levels at nearby properties and confirm the appropriateness of any mitigation applied;
- Measures to prevent and control noise are mainly related to engineering design standards and turbine siting. With modern turbines, mechanical noise is usually significantly lower than aerodynamic noise, and continuous improvement in airfoil design is reducing the latter;
- Operating turbines in reduced noise mode;
- Building walls/appropriate noise barriers around potentially affected buildings (only an option in hilly terrain, due to the height of turbines);
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;

- Establish a mechanism to register complaints regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

5.2.7 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;
- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.8 Control measures for climate change induced impacts

- Construct reactor containment structures of steel-reinforced concrete to withstand heavy rain events as well as hurricanes as intense precipitation pose a threat to the operation of nuclear plants;
- Redesign cooling facilities (water recovery from condenser and heat exchangers, reduction of evaporative losses, secondary or wastewater usage, construction of dry cooling towers);
- Plant trees to restore/afforest/reforest land to address intense precipitation events;
- Develop and implement a nuclear power plant emergency preparedness plan with climate change responses;
- Undertake a climate risk assessment to evaluate the risks of climate variability on nuclear plant infrastructure;
- Train personnel to undergo climate change adaptation training specific to nuclear power stations;
- Develop and implement land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;
- Operate dams more efficiently to balance the interests of environmental flows, flood reduction and agriculture. The low storage capacity of most existing dams in Southern Africa suggests that they cannot be used to store major floods;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific nuclear power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;

- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company’s wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible, to support the local communities’ activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member’s rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the nuclear power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise; and
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

  - How the incident should be reported; and
  - What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting of incidents and feedback are.

8 Influx management

Note: This section presents the requirements for influx management during construction and operation of the nuclear power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
    - There are no technically or financially feasible alternatives to removal;
    - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
    - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
    - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
    - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
    - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
    - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
    - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
    - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management of a nuclear power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the nuclear plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits; and
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensuring timeous corrective actions;
  - Performing follow ups with site management to ensure that non-conformances are corrected and recommendations are implemented within required timeframes;
  - Reporting any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensuring methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees;

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above; and
- In addition to the above environmental awareness, environmental issues should be addressed as follows:
    - Induction on environmental issues for all employees starting to work on the plant; and
    - Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation of the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific nuclear power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and
- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programmme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc. are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Solar Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for solar power plants (e.g. photovoltaic solar energy, solar thermal energy and concentrating power plant) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project. The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific solar power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific solar power project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the solar power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people’s livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China’s overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP’s). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6) ; indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared several guidance notes for some of the energy generation types, e.g. thermal, wind and transmission.

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the solar power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the solar power project based on the likely environmental and/or social impacts. The categories of solar powered projects are presented below for reference purposes.

There are two categories when defining solar powered plants, they are namely:

Category A - Category A projects are likely to have significant adverse environmental and/or social impacts that are irreversible, sensitive, diverse, or unprecedented. In the absence of adequate mitigation measures, Category A projects are considered higher risk.

Category B - Category B projects are likely to have limited adverse environmental and/or social impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures. Category B projects are considered medium risk.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

b) **Category B**: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

c) **Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

d) (d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of solar power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for solar power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific solar power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of solar power plant including transmission and distributions lines;
- Construction of converter station, associated substations;
- Installation of fire management system;
- Installation of communications system;
- Construction of a battery storage facility; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the solar power plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
    - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
    - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
    - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the solar power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plants structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and stormwater monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for dust

- Control dust in the project area to minimize detrimental effects on sensitive environments;
- A scientifically based dust monitoring programme must as a minimum, include a schedule for dust suppression (spraying), speed limits for vehicles on unpaved roads, location and treatment of material stockpiles, the minimisation of the area disturbed at any one time and protection of exposed soil against wind erosion and a reporting mechanisms and action plan in case of excessive wind and dust conditions;
- Introduce dust abatement measures such as the use of water bowsers to wet down nearby road surfaces if necessary; and
- Minimise the area that needs to be cleared of vegetation.

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.6 Control measures for biodiversity

- Conduct a preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions;

- If necessary compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Commence vegetation clearing only after walk-through has been conducted and necessary permits obtained;
- Implement preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.;
- Minimise the extent of vegetation clearing, and do not unnecessary vegetation;
- All construction vehicles should adhere to clearly defined and demarcated roads and speed limits;
- No off-road driving to be allowed outside of the construction area;
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity;
- Remove any fauna threatened by the construction activities. This should be undertaken by the appropriately qualified environmental officer;
- Make use of suitable indigenous plant species when re-vegetating cleared areas;
- Construct new powerlines in such a way that they have minimal impacts on the birds by using bird-friendly designs and bird diverters;
- Minimize the areas cleared for construction activities;
- Avoid and/or minimise light pollution around construction facilities so as not to impact on activities of nocturnal species; and
- Outside lighting should be designed to minimize impacts on avifauna. All outside lighting should be directed away from sensitive areas.

4.2.7 Control measures for sensitive habitats

- Site project facilities to avoid critical wetland, terrestrial and aquatic habitat;
- Design and construct wildlife access to avoid or minimize habitat fragmentation;
- Avoid or modify construction activities during breeding or other sensitive seasons; and
- Minimize removal of native plant species and replanting of native plant species in disturbed areas.

4.2.8 Control measures for management of soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and stormwater control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;
- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;

- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.9 Control measures for hazardous material

- Construct a bunded and fenced area for storage of hazardous materials, using the required safety equipment;
- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site; and
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method.

4.2.10 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.11 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the solar plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.12 Control measures for noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.13 Control measures for visual impacts

- Locate construction camp sites and laydown areas in low visibility, disturbed areas where possible;
- Use existing clumps of exotic/indigenous trees in the landscape to effectively screen camps and laydown areas;
- Minimise construction time, particularly where activities are exposed against the skyline. Materials, coatings and paints should be chosen based on minimal reflectivity where possible;
- Night time construction should be avoided where;
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency;

- As far as possible, the architectural and cultural heritage of the area must be included in the design guidelines for the development; and
- Use of low reflective materials on buildings.

4.2.14 Control measures for climate change induced impacts

- Build increased airflow systems beneath mounting structures to manage the effects of increased temperatures;
- Use heat-resistant Photovoltaic (PV) cells and module components designed to withstand short peaks of very high temperature;
- Use distributed systems (rather than feeding power into single part of the grid) to ameliorate cloud impact;
- Place PV systems where expected changes in cloud cover are relatively low;
- Use micro-inverters for each panel (in place of small numbers of large centralized inverters) to improve stability and increase power output;
- Use cabling and components that can deal with high moisture content and flooding;
- Build panels that can withstand strong winds;
- Restore coastal habitats such as mangroves, or the flood mitigation services provided by wetlands as a measure against storm surges, coastal erosion and flood risk;
- Put mitigation measures in place to control water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability.

5 Operational Phase

Note: This section will present the operational activities of the specific solar power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of solar plant facilities;
- Operate and maintain water and waste management systems;
- Servicing and maintenance of solar panels;
- Serving of battery back-up system;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the solar power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for water quality

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Institute and utilise appropriate water saving measures and technologies to minimise water use;
- Minimum disturbance to be caused to existing topography during preconstruction and construction;
- Water discharging to the environment during all project phases (and to include water and sewage treatment works, as well as water from washing of panels) to comply with relevant water quality standards;
- Ensure legislative requirements are met for sanitation;
- Clean and dirty water is to be separated at point source;
- Place hessian/geofabric attached to rows of stakes to prevent sediment washing downstream of the site during operation;
- Conduct a site selection process that considers the potential for interference of the project's structural components with commercial or recreational fisheries and marine species habitats; and

- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods.

5.2.2 Control measures for stormwater

- Discharge stormwater and any run-off generated by the hard surfaces into retention swales or areas with rock rip-rap. These energy dissipation structures should be placed in manner that flows are managed prior to being discharged back into the natural waters courses, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained;
- Regularly inspect chemical storage containers to ensure early detection of leaks;
- Maintain emergency plans in case of spillages onto road surfaces and into watercourses;
- Maintain structure along all roads and other hardened surfaces that redirect water flow and dissipate any energy in the water which may pose an erosion risk;
- All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques;
- Maintain structures (e.g. gabions and Reno mattresses) to avoid and/or minimise erosion and sedimentation into water bodies and re-vegetate of any disturbed riverbanks;
- Inspection and maintain the erosion protection berm and low flow diversion channel;
- Inspection and maintain of contact and non-contact water diversion channels to divert stormwater from and around infrastructure and facilities;
- Inspection and maintenance stormwater management system; and
- Compile a comprehensive storm water management plan. This plan should include appropriate means for the handling of stormwater within the site, e.g. separate clean and dirty water streams around the plant, install stilling basins to capture large volumes of run-off, trapping sediments and reduce flow velocities as well as appropriate drainage around the site.

5.2.3 Control measures for protection of biodiversity

- Keep retained or re-established indigenous (local) vegetation low by regular mowing to provide habitat for small and fossorial animals and invertebrates, rather than clearing vegetation altogether, in such limited areas where this is necessary; e.g. within areas where high vegetation cannot be tolerated for security and safety reasons;
- Monitor habitat where Red Data species affected by construction have been relocated;
- Monitor habitat (e.g. maintain fire frequency) to ensure optimal habitat conditions for Red Data species and adapt management practices as necessary;
- Address all flora related issues identified during the abovementioned flora monitoring;
- Continue to develop, manage and maintain owner-controlled areas outside the nuclear power station footprint as a nature conservation area (nature reserve);
- Provide access for scientific research and for recreation to nature conservation areas within the owner-controlled area;
- Incorporate additional properties that are purchased into the protected area;
- Continue to implement and maintain the rehabilitation plan;
- Monitor the effectiveness of rehabilitation on rehabilitated terraces and take action to address poor rehabilitation e.g. by addressing erosion and poor establishment of seed;
- Investigate the causes of poor rehabilitation success (e.g. Poor soil preparation, lack of sufficient topsoil, lack of fertilisation, lack of mulching, etc.) and address appropriately;
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site;
- If necessary compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Remove to a safe location any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities;

- Regularly monitor for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility to control the potential spread of invasive alien plant species;
- Clear alien plants using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible; and
- Training and awareness programmes for employees on the significance of the ecology to be carried out at regular intervals.

5.2.4 Control measures for wetlands

- Measures contained in the EMP must be strictly adhered to, under the close supervision of an Sustainability and Environment Manager;
- Implement stormwater management control measures;
- Ensure that project activities are restricted to the development footprint, and that access to ecologically sensitive areas including the wash/pan areas is strictly prohibited;
- Harvesting of plant material or other damage to fauna and flora must be prevented and avoided, and disciplinary measures including dismissal to be put in place; and
- Bunding of any chemical/petroleum/oil storage area is to be implemented.

5.2.5 Control measures for soil or water contamination

- Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill;
- Regularly train staff on how to deal with spills and provide the necessary equipment;
- Waste should be stored in designated areas prior to disposal;
- Maintain bunds around hydrocarbon and chemical storage areas as well as refuelling areas where these exist on site;
- In the event of a spill/leakage from the battery storage facility, the spill must be attended to immediately and be handled in an environmental conscious manner (i.e. no discharge into the ground or any surface water body). Leaked fluids must be disposed of at an appropriate licenced hazardous waste disposal facility; and
- Dispose of all batteries at an appropriate licenced hazardous waste disposal facility.

5.2.6 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;
- Explosives and other flammable materials should be stored in clearly labeled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve; and
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area.

5.2.7 Control measures for management of waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- Ensure compliance of relevant waste management as per in country and other relevant standards;
- All work sites must be kept free of waste;

- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered landfill site;
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using; and
- Inspection and maintain the waste management facilities.

5.2.8 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.9 Control measures for noise impacts

- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

5.2.10 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;
- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.11 Control measures for climate change induced impacts

- Undertake a climate risk assessment to evaluate the risks of climate variability on solar power infrastructure;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific solar power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the solar power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise; and
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

- How the incident should be reported and; and
- What the time limits for reporting incidents and feedback are.

- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting incidents and feedback are.

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the solar power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
  - There are no technically or financially feasible alternatives to removal;
  - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
  - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
  - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
  - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
  - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
  - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
  - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
  - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the solar power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the solar plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits;
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensures timeous corrective actions;
  - Performs follow ups with site management to ensure that non-conformances are corrected and recommendations are implemented within required timeframes;
  - Report any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensures methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific solar power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and

- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Thermal Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for thermal power plants (e.g. boilers (steam turbines), reciprocating engines, combustion turbines, combined cycle and cogeneration) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific thermal power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific thermal power project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the thermal power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference document with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and

development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5) biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared Environmental Health and Safety guidelines for Thermal Power Plants Guideline. The EHS Guidelines for thermal power plants guidelines outlies the general approach to the management of EHS issues in industrial development activities, including power plants, should consider potential impacts as early as possible in the project cycle, including the incorporation of EHS considerations into the site selection and plant design processes in order to maximize the range of options available to prevent and control potential negative impacts. Recommendations for the management of EHS issues common to most large industrial and infrastructure facilities during the construction and decommissioning phases are provided in the General EHS Guidelines (IFC, EHS Guidelines for Thermal Power Plants, 19 December 2008).

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden’s Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the thermal power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the thermal power project based on the likely environmental and/or social impacts. The categories of thermal powered projects are presented below for reference purposes.

There are different types of thermal energy sources namely: coal, nuclear, geothermal, thermal, solar electric, waste incineration plants, as well as many natural gas power plants.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

b) **Category B**: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

d) (d) **Category FI**: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of thermal power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for thermal power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific thermal power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of thermal power plant including transmission and distributions lines;
- Construction of substations and generators;
- Construction of cooling towers/ ponds;
- Construction of a coal combustion waste (CCW) plant for recycling;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, quarry and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the thermal plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired; and
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the thermal power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plant's structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and stormwater monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for air emissions

- Use of loading and unloading equipment that minimizes the height of fuel drop to the stockpile to reduce the generation of fugitive dust and installing of cyclone dust collectors;
- Use of water spray systems to reduce the formation of fugitive dust from solid fuel storage in arid environments;
- Use of enclosed conveyors with well designed, extraction and filtration equipment on conveyor transfer points to prevent the emission of dust;
- For solid fuels of which fine fugitive dust could contain vanadium, nickel and Polycyclic Aromatic Hydrocarbons (PAHs) (e.g., in coal and petroleum coke), use of full enclosure during transportation and covering stockpiles where necessary;
- Storage of lime or limestone in silos with well designed, extraction and filtration equipment; and
- Use of wind fences in open storage of coal or use of enclosed storage structures to minimize fugitive dust emissions where necessary, applying special ventilation systems in enclosed storage to avoid dust explosions (e.g., use of cyclone separators at coal transfer points) (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and

- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free flowing watercourse.

4.2.6 Control measures for water consumption and aquatic habitat alteration

- If there are threatened, endangered, or other protected species or if there are fisheries within the hydraulic zone of influence of the intake, reduction of impingement and entrainment of fish and shellfish by the installation of technologies such as barrier nets (seasonal or year-round), fish handling and return systems, fine mesh screens, wedge wire screens, and aquatic filter barrier systems (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

4.2.7 Control measures for biodiversity

- Conduct a preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with permitting conditions;
- If necessary, compile and implement a Biodiversity Diversity Action Plan to provide the responsible company with a framework for the management of biodiversity (including ecosystem goods and services) within their project site;
- Commence vegetation clearing only after walk-through has been conducted and necessary permits obtained;
- Implement preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness regarding no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.;
- Minimise the extent of vegetation clearing, and do not unnecessary vegetation;
- All construction vehicles should adhere to clearly defined and demarcated roads and speed limits;
- No off-road driving to be allowed outside of the construction area;
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity;
- Remove any fauna threatened by the construction activities. This should be undertaken by the appropriately qualified environmental officer;
- Make use of suitable indigenous plant species when re-vegetating cleared areas; and
- Minimize the areas cleared for construction activities.

4.2.8 Control measures for management of soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and stormwater control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;
- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;

- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.9 Control measures for hazardous material

- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site;
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method;
- Inspect and maintenance of bunded and fenced area for storage of hazardous materials, with required safety equipment; and
- In addition recommended measures to prevent, minimize, and control hazards associated with hazardous materials storage and handling at thermal power plants include the use of double-walled, underground pressurized tanks for storage of pure liquefied ammonia (e.g., for use as reagent for SCR) in quantities over 100m3; tanks of lesser capacity should be manufactured using annealing processes (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

4.2.10 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.11 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the thermal plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.12 Control measures for noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.13 Control measures for climate change induced impacts

- Use strengthened materials during construction to improve the robustness of plant stations to manage the impacts of drought and floods;
- Provide additional storage capacity to manage the impacts of extreme events;
- Increase wind proof standards that can be compromised due to increase storms and winds;
- Build or enlarge reservoirs to reduce flood risk;
- Build or enlarge reservoirs to reduce water shortages during drought or precipitation decrease;
- Conduct hazard assessments;
- Build flood control systems (embankments, dykes, ponds, barriers) to address sea-level rise;
- Restore coastal habitats such as mangroves, or the flood mitigation services provided by wetlands, as measures against storm surges, coastal erosion and flood risk;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability.

5 Operational Phase

Note: This section will present the operational activities of the specific thermal power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of thermal power plant facility;
- Operate and maintain water and waste management systems;
- Maintenance of substations and generators;
- Maintenance of cooling towers/ ponds;
- Maintenance of a coal combustion waste (CCW) plant for recycling;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the thermal power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for air emissions

- Use of the cleanest fuel economically available (natural gas is preferable to oil, which is preferable to coal) if that is consistent with the overall energy and environmental policy of the responsible plant. For most large power plants, fuel choice is often part of the national energy policy, and fuels, combustion technology and pollution control technology, which are all interrelated, should be evaluated very carefully upstream of the project to optimize the project's environmental performance;
- When burning coal, giving preference to high-heat-content, low-ash, and low-sulfur coal;
- Considering beneficiation to reduce ash content, especially for high ash coal;
- Selection of the best power generation technology for the fuel chosen to balance the environmental and economic benefits. The choice of technology and pollution control systems will be based on the site-specific environmental assessment (some examples include the use of higher energy-efficient systems, such as combined cycle gas turbine system for natural gas and oil-fired units, and supercritical, ultra- supercritical or integrated coal gasification combined cycle (IGCC) technology for coal-fired units;
- Designing stack heights according to Good International Industry Practice (GIIP) to avoid excessive ground level concentrations and minimize impacts, including acid deposition; and
- Considering use of combined heat and power (CHP, or co- generation) facilities. By making use of otherwise wasted heat, CHP facilities can achieve thermal efficiencies of 70 – 90 percent,

compared with 32 – 45 percent for conventional thermal power plants (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.2 Control measures for sulfur dixiode

- Use of fuels with a lower content of sulfur where economically feasible;
- Use of lime (CaO) or limestone (CaCO3) in coal-fired fluidized bed combustion boilers to have integrated desulfurization which can achieve a removal efficiency of up to 80-90 % through use of Fluidized Bed Combustion; and
- Depending on the plant size, fuel quality, and potential for significant emissions of SO2, use of flue gas desulfurization (FGD) for large boilers using coal or oil and for large reciprocating engines. The optimal type of FGD system (e.g., wet FGD using limestone with 85 to 98% removal efficiency, dry FGD using lime with 70 to 94% removal efficiency, seawater FGD with up to 90% removal efficiency) depends on the capacity of the plant, fuel properties, site conditions, and the cost and availability of reagent as well as by-product disposal and utilization (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.3 Control measures for nitrogen oxides

- Use of low NOX burners with other combustion modifications, such as low excess air (LEA) firing, for boiler plants. Installation of additional NOX controls for boilers may be necessary to meet emissions limits; a selective catalytic reduction (SCR) system can be used for pulverized coal-fired, oil-fired, and gas-fired boilers or a selective non- catalytic reduction (SNCR) system for a fluidized-bed boiler;
- Use of dry low-NOX combustors for combustion turbines burning natural gas;
- Use of water injection or SCR for combustion turbines and reciprocating engines burning liquid fuels;
- Optimization of operational parameters for existing reciprocating engines burning natural gas to reduce NOx emissions; and
- Use of lean-burn concept or SCR for new gas engines (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.4 Control measures for particulate matter

- Installation of dust controls capable of over 99% removal efficiency, such as electrostatic precipitators (ESPs) or Fabric Filters (baghouses), for coal-fired power plants. The advanced control for particulates is a wet ESP, which further increases the removal efficiency and also collects condensables (e.g., sulfuric acid mist) that are not effectively captured by an ESP or a fabric filter;
- Use of loading and unloading equipment that minimizes the height of fuel drop to the stockpile to reduce the generation of fugitive dust and installing of cyclone dust collectors;
- Use of water spray systems to reduce the formation of fugitive dust from solid fuel storage in arid environments;
- Use of enclosed conveyors with well designed, extraction and filtration equipment on conveyor transfer points to prevent the emission of dust;
- For solid fuels of which fine fugitive dust could contain vanadium, nickel and Polycyclic Aromatic Hydrocarbons (PAHs) (e.g., in coal and petroleum coke), use of full enclosure during transportation and covering stockpiles where necessary;
- Design and operate transport systems to minimize the generation and transport of dust on site;
- Storage of lime or limestone in silos with well designed, extraction and filtration equipment; and
- Use of wind fences in open storage of coal or use of enclosed storage structures to minimize fugitive dust emissions where necessary, applying special ventilation systems in enclosed storage to avoid dust explosions (e.g., use of cyclone separators at coal transfer points) (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.5 Control measures for emissions offsets

- Use of less carbon intensive fossil fuels (i.e., less carbon containing fuel per unit of calorific value - gas is less than oil and oil is less than coal) or co-firing with carbon neutral fuels (i.e., biomass);
- Use of combined heat and power plants (CHP) where feasible;

- Use of higher energy conversion efficiency technology of the same fuel type / power plant size than that of the country/region average. New facilities should be aimed to be in top quartile of the country/region average of the same fuel type and power plant size. Rehabilitation of existing facilities must achieve significant improvements in efficiency;
- Consider efficiency-relevant trade-offs between capital and operating costs involved in the use of different technologies. For example, supercritical plants may have a higher capital cost than subcritical plants for the same capacity, but lower operating costs. On the other hand, characteristics of existing and future size of the grid may impose limitations in plant size and hence technological choice. These tradeoffs need to be fully examined;
- Use of high performance monitoring and process control techniques, good design and maintenance of the combustion system so that initially designed efficiency performance can be maintained;
- Where feasible, arrangement of emissions offsets (including the Kyoto Protocol's flexible mechanisms and the voluntary carbon market), including reforestation, afforestation, or capture and storage of CO2 or other currently experimental options;
- Where feasible, include transmission and distribution loss reduction and demand side measures. For example, an investment in peak load management could reduce cycling requirements of the generation facility thereby improving its operating efficiency. The feasibility of these types of off-set options may vary depending on whether the facility is part of a vertically integrated utility or an independent power producer; and
- Consider fuel cycle emissions and off-site factors (e.g., fuel supply, proximity to load centers, potential for off-site use of waste heat, or use of nearby waste gases (blast furnace gases or coal bed methane) as fuel. Etc (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.6 Control measures for water consumption and aquatic habitat alteration

- Use of a closed-cycle, recirculating cooling water system (e.g., natural or forced draft cooling tower), or closed circuit dry cooling system (e.g., air cooled condensers) if necessary to prevent unacceptable adverse impacts. Cooling ponds or cooling towers are the primary technologies for a recirculating cooling water system. Once-through cooling water systems may be acceptable if compatible with the hydrology and ecology of the water source and the receiving water and may be the preferred or feasible alternative for certain pollution control technologies such as seawater scrubbers;
- Use of dry scrubbers in situations where these controls are also required or recycling of wastewater in coal plants for use as FGD makeup;
- Use of air-cooled systems;
- Reduction of maximum through-screen design intake velocity to 0.5 ft/s; and
- Reduction of intake flow to the following levels:
  - For freshwater rivers or streams to a flow sufficient to maintain resource use (i.e., irrigation and fisheries) as well as biodiversity during annual mean low flow conditions;
  - For lakes or reservoirs, intake flow must not disrupt the thermal stratification or turnover pattern of the source water;
  - For estuaries or tidal rivers, reduction of intake flow to 1% of the tidal excursion volume; and
  - Examples of operational measures to reduce impingement and entrainment include seasonal shutdowns, if necessary, or reductions in flow or continuous use of screens. Designing the location of the intake structure in a different direction or further out into the water body may also reduce impingement and entrainment (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.7 Control measures for thermal effluents

Effluents from thermal power plants include thermal discharges, wastewater effluents, and sanitary wastewater. Thermal discharges should be designed to prevent negative impacts to the receiving water taking into account the following criteria:

- The elevated temperature areas because of thermal discharge from the project should not impair the integrity of the water body as a whole or endanger sensitive areas (such as recreational areas, breeding grounds, or areas with sensitive biota);

- There should be no lethality or significant impact to breeding and feeding habits of organisms passing through the elevated temperature areas;
- There should be no significant risk to human health or the environment due to the elevated temperature or residual levels of water treatment chemicals;
- Use of multi-port diffusers;
- Adjustment of the discharge temperature, flow, outfall location, and outfall design to minimize impacts to acceptable level (i.e., extend length of discharge channel before reaching the surface water body for pre-cooling or change location of discharge point to minimize the elevated temperature areas); and
- Use of a closed-cycle, recirculating cooling water system as described above (e.g., natural or forced draft cooling tower), or closed circuit dry cooling system (e.g., air cooled condensers) if necessary to prevent unacceptable adverse impacts. Cooling ponds or cooling towers are the primary technologies for a recirculating cooling water system (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.8 Control measures for liquid waste

Recommended water treatment and wastewater conservation methods include:

- Recycling of wastewater in coal plants for use as FGD makeup. This practice conserves water and reduces the number of wastewater streams requiring treatment and discharge;
- In coal power plants without FGD systems, treatment of process wastewater in conventional physical-chemical treatment systems for pH adjustment and removal of total suspended solids (TSS), and oil / grease, at a minimum. Depending on local regulations, these treatment systems can also be used to remove most heavy metals to part-per-billion (ppb) levels by chemical precipitation as either metal hydroxide or metal organosulfide compounds;
- Collection of fly ash in dry form and bottom ash in drag chain conveyor systems in new coal power plants;
- Consider use of soot blowers or other dry methods to remove fireside wastes from heat transfer surfaces so as to minimize the frequency and amount of water used in fireside washes;
- Use of infiltration and runoff control measures such as compacted soils, protective liners, and sedimentation controls for runoff from coal piles;
- Spraying of coal piles with anionic detergents to inhibit bacterial growth and minimize acidity of leachate;
- Use of SOX removal systems that generate less wastewater, if feasible; however, the environmental and cost characteristics of both inputs and wastes should be assessed on a case-by-case basis;
- Treatment of low-volume wastewater streams that are typically collected in the boiler and turbine room sumps in conventional oil-water separators before discharge;
- Treatment of acidic low-volume wastewater streams, such as those associated with the regeneration of makeup demineralizer and deep-bed condensate polishing systems, by chemical neutralization in-situ before discharge;
- Pre-treatment of cooling tower makeup water, installation of automated bleed/feed controllers, and use of inert construction materials to reduce chemical treatment requirements for cooling towers;
- Elimination of metals such as chromium and zinc from chemical additives used to control scaling and corrosion in cooling towers; and
- Use the minimum required quantities of chlorinated biocides in place of brominated biocides or alternatively apply intermittent shock dosing of chlorine as opposed to continuous low level feed (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.9 Control measures for solid waste

- Dry handling of the coal combustion wastes, in particular fly ash. Dry handling methods do not involve surface impoundments and, therefore, do not present the ecological risks identified for impoundments (e.g., metal uptake by wildlife);
- Recycling of CCWs in uses such as cement and other concrete products, construction fills (including structural fill, flowable fill, and road base), agricultural uses such as calcium fertilizers (provided trace metals or other potentially hazardous materials levels are within accepted

thresholds), waste management applications, mining applications, construction materials (e.g., synthetic gypsum for plasterboard), and incorporation into other products provided the residues (such as trace metals and radioactivity) are not considered hazardous. Ensuring consistent quality of fuels and additives helps to ensure the CCWs can be recycled. If beneficial reuse is not feasible, disposal of CCW in permitted landfills with environmental controls such as run-on/run-off controls, liners, leachate collection systems, ground-water monitoring, closure controls, daily (or other operational) cover, and fugitive dust controls is recommended;

- Dry collection of bottom ash and fly ash from power plants combusting heavy fuel oil if containing high levels of economically valuable metals such as vanadium and recycle for vanadium recovery (where economically viable) or disposal in a permitted landfill with environmental controls;
- Management of ash disposal and reclamation so as to minimize environmental impacts – especially the migration of toxic metals, if present, to nearby surface and groundwater bodies, in addition to the transport of suspended solids in surface runoff due to seasonal precipitation and flooding. In particular, construction, operation, and maintenance of surface impoundments should be conducted in accordance with internationally recognized standards; and
- Reuse of sludge from treatment of waste waters from FGD plants. This sludge may be re-used in the FGD plant due to the calcium components. It can also be used as an additive in coal plant combustion to improve the ash melting behaviour (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.10 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;
- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve;
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area; and
- In addition recommended measures to prevent, minimize, and control hazards associated with hazardous materials storage and handling at thermal power plants include the use of double-walled, underground pressurized tanks for storage of pure liquefied ammonia (e.g., for use as reagent for SCR) in quantities over 100m3; tanks of lesser capacity should be manufactured using annealing processes (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

5.2.11 Control measures for management of traffic impacts

No unauthorised persons should be allowed onto the site

- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.12 Control measures for noise impacts

- Principal sources of noise in thermal power plants include the turbine generators and auxiliaries; boilers and auxiliaries, such as coal pulverizers; reciprocating engines; fans and ductwork; pumps; compressors; condensers; precipitators, including rappers and plate vibrators; piping and valves; motors; transformers; circuit breakers; and cooling towers. Thermal power plants used for base load operation may operate continually while smaller plants may operate less frequently but still pose a significant source of noise if located in urban areas. Recommend measures to prevent, minimize, and control noise from thermal power plants include:
    - Siting new facilities with consideration of distances from the noise sources to the receptors (e.g., residential receptors, schools, hospitals, religious places) to the extent possible. If the local land use is not controlled through zoning or is not effectively enforced, examine whether residential receptors could come outside the acquired plant boundary. In some cases, it could be more cost effective to acquire additional land as buffer zone than relying on technical noise control measures, where possible;
    - Use of noise control techniques such as: using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound- absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements); applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping;
    - Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines, especially where sensitive noise receptors may be present; and
    - Noise propagation models may be effective tools to help evaluate noise management options such as alternative plant locations, general arrangement of the plant and auxiliary equipment, building enclosure design, and, together with the results of a baseline noise assessment, expected compliance with the applicable community noise requirements.

5.2.13 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;
- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.14 Control measures for climate change induced impacts

- Construct more efficient cooling systems (wastewater usage, water reuse, water recovery from heat exchangers, reduction of evaporative losses) and decentralised generation to manage the impacts of increased temperatures;
- Develop emergency planning procedures to manage extreme events;
- Develop improved models used to predict storms;
- Conduct hazard assessments;
- Undertake a climate risk assessment to evaluate the risks of climate variability on thermal infrastructure;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;

- Operate dams more efficiently to balance the interests of environmental flows, flood reduction and agriculture. The low storage capacity of most existing dams in Southern Africa suggests that they cannot be used to store major floods;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific thermal power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes ;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
    - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
    - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
    - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.;
    - Sexual misconduct; and
    - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the thermal power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise; and
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

  - How the incident should be reported; and
  - What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting incidents and feedback are.

7.5 Occupational health and safety hazards of a thermal power plant

General safety procedures will be prescribed for specific types of potential hazards associated with day-to-day operation of a thermal power plant. The procedures will address ways to eliminate or control

Any hazard. In addition, the following health and safety impacts are of particular concern during operation of thermal power plants:

- Non-ionizing radiation;
- Heat;
- Noise;
- Confined spaces;
- Electrical hazards;
- Fire and explosion hazards;
- Chemical hazards; and
- Dust.

7.5.1 Non-ionizing radiation

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational Electro Magnetic Fields (EMF) levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers; and
- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non- Ionizing Radiation Protection (ICNIRP), the Institute of Electrical and Electronics Engineers (IEEE). Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels (e.g., 50 percent). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.2 Heat

Occupational exposure to heat occurs during operation and maintenance of combustion units, pipes, and related hot equipment. Recommended prevention and control measures to address heat exposure at thermal power plants include:

- Regular inspection and maintenance of pressure vessels and piping;

- Provision of adequate ventilation in work areas to reduce heat and humidity;
- Reducing the time required for work in elevated temperature environments and ensuring access to drinking water;
- Shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc.; and
- Use of warning signs near high temperature surfaces and personal protective equipment (PPE) as appropriate, including insulated gloves and shoes (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.3 Noise

Noise sources in combustion facilities include the turbine generators and auxiliaries; boilers and auxiliaries, such as pulverizers; diesel engines; fans and ductwork; pumps; compressors; condensers; precipitators, including rappers and plate vibrators; piping and valves; motors; transformers; circuit breakers; and cooling towers. Recommendations for reducing noise and vibration are discussed in Section 1.1, above. In addition, recommendations to prevent, minimize, and control occupational noise exposures in thermal power plants include:

- Provision of sound-insulated control rooms with noise levels below 60 dBA29;
- Design of generators to meet applicable occupational noise levels; and
- Identify and mark high noise areas and require that personal noise protecting gear is used all the time when working in such high noise areas (typically areas with noise levels >85 dBA) (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.4 Electrical hazards

Energized equipment and power lines can pose electrical hazards for workers at thermal power plants. Recommended measures to prevent, minimize, and control electrical hazards at thermal power plants include:

- Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization;
- Use of voltage sensors prior to and during workers' entrance into enclosures containing electrical components;
- Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them; and
- Provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits. This training should include, but not be limited to, training in basic electrical theory, proper safe work procedures, hazard awareness and identification, proper use of PPE, proper lockout/tagout procedures, first aid including CPR, and proper rescue procedures. Provisions should be made for periodic retraining as necessary (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.5 Fire and explosion hazards

Thermal power plants store, transfer, and use large quantities of fuels; therefore, careful handling is necessary to mitigate fire and explosion risks. In particular, fire and explosion hazards increase as the particle size of coal is reduced. Particle sizes of coal that can fuel a propagating explosion occur within thermal dryers, cyclones, baghouses, pulverized-fuel systems, grinding mills, and other process or conveyance equipment.

- Use of automated combustion and safety controls;
- Proper maintenance of boiler safety controls;
- Implementation of startup and shutdown procedures to minimize the risk of suspending hot coal particles (e.g., in the pulverizer, mill, and cyclone) during startup;

- Regular cleaning of the facility to prevent accumulation of coal dust (e.g., on floors, ledges, beams, and equipment);
- Removal of hot spots from the coal stockpile (caused by spontaneous combustion) and spread until cooled, never loading hot coal into the pulverized fuel system; and
- Use of automated systems such as temperature gauges or carbon monoxide sensors to survey solid fuel storage areas to detect fires caused by self-ignition and to identify risk points (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.6 Chemical hazards

Thermal power plants utilize hazardous materials, including ammonia for NOX control systems, and chlorine gas for treatment of cooling tower and boiler water. Recommendation for chemical hazards include:

- Consider generation of ammonia on site from urea or use of aqueous ammonia in place of pure liquefied ammonia; and
- Consider use of sodium hypochlorite in place of gaseous chlorine (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

7.5.7 Dust

Dust is generated in handing solid fuels, additives, and solid wastes (e.g., ash). Dust may contain silica (associated with silicosis), arsenic (skin and lung cancer), coal dust (black lung), and other potentially harmful substances.

Use of dust controls (e.g., exhaust ventilation) to keep dust below applicable guidelines or wherever free silica levels in airborne dust exceed 1 percent.

Regular inspection and maintenance of asbestos containing materials (e.g., insulation in older plants may contain asbestos) to prevent airborne asbestos particles (Environmental, Health, and Safety Guidelines for Thermal Power Plants Guideline, 19 December 2008).

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the thermal power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
    - There are no technically or financially feasible alternatives to removal;
    - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
    - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
    - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
    - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
    - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
    - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
    - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
    - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the thermal power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the coal plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits; and
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensures timeous corrective actions;
  - Performs follow ups with site management to ensure that non-conformance are corrected and recommendations are implemented within required timeframes;
  - Report any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensures methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific thermal power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and
- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding of the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc. are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

<u>Note:</u> This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Transmission Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for transmission power plant (e.g. Overhead, electric, underground and special and wireless power transmission) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific transmission power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific transmission power project. As a starting point, refer to the overview of regional and international requirements (section 3.2) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the transmission power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5); biodiversity conservation and sustainable management of living natural resources (PS6) ; indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared Environmental Health and Safety guidelines for electric power transmission and distribution. The EHS Guidelines for Electric power transmission and distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas (IFC, EHS Guidelines, 30 April 2007).

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden's Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like;

environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the transmission power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the transmission power project based on the likely environmental and/or social impacts. The categories of transmission powered projects are presented below for reference purposes.

There are different types of transmission power plants namely: overhead, electric, underground and special and wireless power transmission.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

b) **Category B**: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

d) (d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of transmission power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for transmission power projects.

Note: This section will present the construction activities and infrastructural requirements of the specific transmission power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of transmission power plant including transmission and distributions lines;
- Construction of substations and generators;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the transmission power plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the transmission power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the project's structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and stormwater monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.5 Control measures for soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and stormwater control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance

of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;

- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.6 Control measures for hazardous material

- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site;
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method;
- Inspect and maintenance of bunded and fenced area for storage of hazardous materials, with required safety equipment; and
- In addition recommended measures to prevent, minimize, and control hazards associated with hazardous materials storage and handling at transmission power plants include the use of double-walled, underground pressurized tanks for storage of pure liquefied ammonia (e.g., for use as reagent for SCR) in quantities over 100m3; tanks of lesser capacity should be manufactured using annealing processes (Environmental, Health, and Safety Guidelines for Transmission Power Plants Guideline, 19 December 2008).

4.2.7 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.8 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the transmission plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.9 Control measures for noise impacts

- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;

- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.10 Control measures for terrestrial habitat alteration

- Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible;
- Installation of transmission lines above existing vegetation to avoid land clearing; and
- Avoidance of construction activities during the breeding season and other sensitive seasons or times of day.

4.2.11 Control measures for avian and bat collisions

- It is recommended a pre and post construction bird monitoring programme be conducted for this project, to increase our understanding of the potential issues, which are largely uncertain at this stage due to the lack of experience with solar energy facilities. It is recommended that this programme take the following form (to be refined and expanded on during the site-specific EMP. The exact methods and activities of this monitoring programme should be determined by a supervising avifaunal specialist. The programme will likely need to consist of a number of site visits, which will aim to:
    - Characterise the site in terms of bird diversity and abundance, through the use of walked transects and/or point counts of bird species;
    - Determine where these species occur on site, in particular mapping out territories and breeding sites for those relevant species; and
    - Characterize the site in terms of bird flight behaviour over and close to site, through a number of vantage point counts, during which all bird flight is recorded. These activities should be continued post construction, preferably for a similar duration to pre- construction. The results should be analysed and reported on by the supervising avifaunal specialist. The findings should be used to implement management measures where necessary (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

4.2.12 Control measures for marine habitat alteration

- Locating and siting cable routes, and shore access, to avoid critical marine habitats (e.g. breeding grounds and eelgrass) and coral reefs;
- Burying submarine cables when traversing sensitive intertidal habitat; and
- Avoiding laying submarine cable during fish and marine mammals breeding periods, calving periods, and spawning seasons (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

4.2.13 Control measures for electric and magnetic fields

- Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

4.2.14 Control measures for climate change induced impacts

- Use strengthened material to provide additional powerline and pipeline protection to manage the impacts related to increased temperatures. Underground transport and transfer structures could be used. Cooling for substations and transformers and Information and Communications Technology (ICT) components that are resistant to high temperatures could also be considered;
- Develop emergency planning procedures to manage the impacts of extreme events related to climate change;
- Construct concrete-sided buildings instead of metal;

- Restore coastal habitats such as mangroves, or the flood mitigation services provided by wetlands as measures against storm surges, coastal erosion and flood risk;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;
- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate.

5 Operational Phase

Note: This section will present the operational activities of the specific transmission power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of transmission power plant;
- Operate and maintain water and waste management systems;
- Maintenance of sub stations and generators;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the transmission power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for terrestrial habitat alteration

- Revegetation of disturbed areas with native plant species;
- Scheduling activities to avoid breeding and nesting seasons for any critically endangered or endangered wildlife species;
- Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response; and
- Avoiding use of machinery in the vicinity of watercourses (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.2 Control measures for forest fires

- Monitoring right-of-way vegetation according to fire risk;
- Removing blowdown and other high-hazard fuel accumulations;
- Time thinning, slashing, and other maintenance activities to avoid forest fire seasons;
- Disposal of maintenance slash by truck or controlled burning. Controlled burning should adhere to applicable burning regulations, fire suppression equipment requirements, and typically must be monitored by a fire watcher;
- Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; and
- Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.3 Control measures for avian and bat collisions and electrocutions

- Ensuring that the bird monitoring programme is undertaken in conjunction with a suitably qualified avifaunal specialist;
- Aligning transmission corridors to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors);
- Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g. insulated ”V's”), changing the location of conductors, and / or using raptor hoods;
- Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats); and
- Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.4 Control measures for aquatic habitat alteration

- Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas), as well as fish spawning habitat, and critical fish over-wintering habitat; and
- Maintaining fish access when road crossings of watercourses are unavoidable by utilizing clear span bridges, open-bottom culverts, or other approved methods (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.5 Control measures for marine habitat alteration

- Monitoring cable laying path for presence of marine mammals (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.6 Control measures for electric and magnetic fields

- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; and
- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include:
    - Shielding with specific metal alloys;
    - Burying transmission lines;
    - Increasing height of transmission towers; and
    - Modifications to size, spacing, and configuration of conductors (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

5.2.7 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;
- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;
- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least

120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve; and

- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area.

5.2.8 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.9 Control measures for noise impacts

- Siting new facilities with consideration of distances from the noise sources to the receptors (e.g., residential receptors, schools, hospitals, religious places) to the extent possible. If the local land use is not controlled through zoning or is not effectively enforced, examine whether residential receptors could come outside the acquired plant boundary. In some cases, it could be more cost effective to acquire additional land as buffer zone than relying on technical noise control measures, where possible;
- Use of noise control techniques such as: using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound- absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements); applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping;
- Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines, especially where sensitive noise receptors may be present; and
- Noise propagation models may be effective tools to help evaluate noise management options such as alternative plant locations, general arrangement of the plant and auxiliary equipment, building enclosure design, and, together with the results of a baseline noise assessment, expected compliance with the applicable community noise requirements.

5.2.10 Control measures for climate change induced impacts

- Develop and undertake emergency planning procedures and regular infrastructure assessments and monitoring;
- Undertake a climate risk assessment to evaluate the risks of climate variability on transmission infrastructure;
- Strengthen overland lines to make them better able to withstand extreme weather events;
- Carry out flood hazard assessments;
- Improve models used to predict storms;
- Develop and implement better land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific transmission power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and
- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc.
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
    - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
    - Sexual misconduct; and
    - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
    - Location for lodging of grievances;
    - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
    - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
    - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the transmission power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise;
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;
  - Who should be informed of incidents;

- How the incident should be reported; and
- What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting incidents and feedback are.

7.5 Occupational health and safety hazards of a transmission power plant

Most occupational health and safety issues during the construction, operation, maintenance, and decommissioning of electric power distribution projects are common to those of large industrial facilities. These impacts include, among others, exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery. Occupational health and safety hazards specific to electric power transmission and distribution projects primarily include:

- Live power lines;
- Working at height;
- Electric and magnetic fields; and
- Exposure to chemicals

7.5.1 Live Power Lines

Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities. Prevention and control measures associated with live power lines include:

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment;
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines;
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following:
  - Distinguish live parts from other parts of the electrical system;
  - Determine the voltage of live parts;
  - Understand the minimum approach distances outlined for specific live line voltages; and
  - Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system.
- Workers should not approach an exposed energized or conductive part even if properly trained unless:
  - The worker is properly insulated from the energized part with gloves or other approved insulation;
  - The energized part is properly insulated from the worker and any other conductive object; or,
  - The worker is properly isolated and insulated from any other conductive object (live-line work).

- Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan;
- Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities; and
- Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

7.5.2 Working at height on poles and structures

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

- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures, inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7 meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point;
- Installation of fixtures on tower components to facilitate the use of fall protection systems;
- Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained;
- Safety belts should be of not less than 16 millimetres (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibres become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work; and
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

7.5.3 Electric and magnetic fields

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

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers;
- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE); and
- Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels (e.g. 50 percent). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance

between the source and the worker, when feasible, or the use of shielding materials (IFC, EHS for Electric Power Transmission and Distribution Guideline Guidelines, 30 April 2007).

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the transmission power plant. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
    - There are no technically or financially feasible alternatives to removal;
    - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
    - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
    - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
    - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
    - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
    - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
    - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
    - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the transmission power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the transmission plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits;
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensures timeous corrective actions;
  - Performs follow ups with site management to ensure that non-conformance are corrected and recommendations are implemented within required timeframes;
  - Report any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensures methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific transmission power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and
- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Maintain the following on site:
    - A daily site register;
    - A non-conformance register (NCR); and
    - A public complaint register.
- Keeping photographic record of progress on the site;
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Construction and Operational Management Plan for a Wind Power Project

Table of Contents

1 Introduction

1.1 Purpose of this plan

The purpose of a construction and operational management plan (C&OMP) for wind power plants (e.g. remote wind plants, hybrid wind plants, connected wind plants and wind farms) is to outline general construction and operational activities, procedures, and requirements for the construction and operational phases of the project.

The C&OMP has been written to help uniformly direct and control construction and operational activities with a view to managing the environmental and social impacts arising from these activities.

Note: This is a generic management plan that will need to be tailored based on the project description and the responsible company's standards, procedures and policies. Additionally, it is intended that revisions and improvements be made to the plan by the responsible company as warranted by feedback and findings through the reporting, monitoring, audit and review process.

The C&OMP will need to be implemented by the responsible companies as well as all its contractors, sub-contractors and its other appointees. The C&OMP must always be read and implemented in conjunction with the related contract conditions of lenders and requirements set by the environmental regulators.

1.2 Background to the project

Note: This section provides a background to the specific wind power project.

2 Policy and legislative framework

2.1 Overview

This section provides an overview of the legislative requirements, relevant policies, directives and guidelines applicable to the project covering national legislation, international standards and guidelines.

2.2 Regional policies and agreements relevant to the project

Note: This section presents a high-level overview of applicable environmental and social requirements of the Southern African Development Community (SADC), African Union and international agencies that are relevant to the specific wind project. As a starting point, refer to the overview of regional and international requirements (section 4) contained in the ESMF.

SADC: The SADC Protocol on Energy of 1996, is a protocol that was developed to promote the harmonious development of national energy policies and matters of common interest for the balanced and equitable development of energy throughout the SADC Region. The protocol is guided by the principles of using energy to support economic growth and development, alleviate poverty and promoting self- reliance amongst the various member states. The protocol clearly outlines the institutional mechanisms and financial provisions in place for implementing the protocol. Through the protocol, the processes of sharing of energy data and information and co-operating with non- SADC states and organisations are clearly defined.

African Union: Programme for Infrastructure Development in Africa (PIDA) is a continent-wide program to develop a vision, policies, strategies and a programme for the development of priority regional and continental infrastructure in transport, energy, trans-boundary water and Information Communication Technologies (ICT). The overall goal of PIDA is to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services. The PIDA Sector Studies will assist in developing a vision on Africa's infrastructure based on strategic objectives and sector polices; prioritized regional and continental infrastructure investment programs (Energy, Transport, ICT) and Trans-boundary Water Resources) over the short, medium, and long term, up to the year 2030. In addition, the Studies will recommend the required institutional arrangements, legal frameworks, and the financing mechanisms for the implementation and monitoring of the programs.

SAPP: The SAPP have developed several Environmental Management Guidelines for use by member utilities. The guidelines include:

- The risk matrix (including likelihood, severity and cost effectiveness);
- Environmental and social impact assessment guidelines (for transmission infrastructure and hydroelectric projects); and
- Polychlorinated biphenyl (PCB) management guidelines.

In addition to the Environmental Management Guidelines, the SAPP ESC has also developed the SAPP Position on Climate Change which spells out the regional organization's commitment to combat change though the implementation of renewable energy projects as well as sustainable management of the non-renewable sources of energy.

2.3 Lender requirements

Note: Projects seeking international funding will need to take account of the specific requirements of lenders. This section will present the environmental and social safeguard requirements of project lenders. For reference purposes, a brief synopsis of the safeguard policies, standards and guidelines of key lenders involved in energy projects are presented below. The list is not exhaustive and should be adapted based on who is funding the wind power project. An overview of all lender requirements (section 4) is contained in the ESMF.

2.3.1 World Bank

The Environmental Health and Safety (EHS) Guidelines were published by the World Bank in December 2007 as a technical source of information during project appraisal activities. The EHS General Guidelines is a reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The EHS Guidelines document outlines the performance measures that are generally considered to be achievable in the new facilities by existing technology at reasonable costs. The EHS document covers various environmental, social and health and safety components.

The environmental and social operational policies of the World Bank help promote socially and environmentally sustainable approaches to development as well as to ensure that World Bank Operations do not harm people and the environment. These safeguard policies address environmental and social issues in the project design, implementation and operation phases and provide a framework for consultation with communities and for public disclosure. The safeguard policies incorporate the World Bank's policy on Environmental Assessment (EA) and those policies that fall within the scope of the EA include the following operational policies:

- OP 4.00 - Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank Projects;
- OP 4.01 – Environmental Assessment;
- OP 4.03 - Performance Standards for Private Sector Activities;
- OP 4.04 – Natural habitats;
- OP 4.09 – Pest management;
- OP 4.10 - Indigenous Peoples;
- OP 4.11 – Physical Cultural Resources;
- OP 4.12 – Involuntary Resettlement;
- OP 4.36 – Forests;
- OP 4.37 - Safety of Dams;
- OP 7.50 – International Waterways; and
- OP 7.60 – Projects in Disputed Areas.

2.3.2 African Development Bank

The African Development Bank (AfDB) is a multilateral development finance institution established to contribute to the economic development and social progress of African countries. On December 17, 2013 the Boards of the African Development Bank unanimously adopted the Integrated Safeguards System (ISS) – a cornerstone of the Bank's strategy to promote growth that is socially inclusive and environmentally sustainable. Safeguards are a powerful tool for identifying risks, reducing development costs and improving project sustainability, thus benefiting affected communities and helping to preserve the environment. With this Integrated Safeguards System the Bank will be better equipped to address emerging environmental and social development challenges.

Power Africa is a new five-year American presidential initiative launched by President Barack Obama in Tanzania during his Africa Tour in July 2013. The initiative aims at supporting economic growth and

development by increasing access to reliable, affordable, and sustainable power in Africa. The program is designed as a multi-stakeholder partnership among the governments of the United States of America, Tanzania, Kenya, Ethiopia, Ghana, Nigeria and Liberia, the US and the African private sector. The AfDB has been a key partner in the design of the initiative and will continue to be during its implementation.

2.3.3 Chinese Development Bank

China Development Bank (CDB) was founded in 1994 as a policy financial institution under the direct leadership of the State Council. It was incorporated as China Development Bank Corporation in December 2008, and officially defined by the State Council as a development finance institution in March 2015. CBD through its organisations has missions to enhance national competitiveness and improve people's livelihoods by effectively addressing fundamental production and development issues affecting the general public. Sustainable development of the Chinese economy requires development finance to continue to play its role. CDB will continue to support major national projects, increase the provision of public goods, and continuously build up economic development momentum; create new scope for regional development, and tap into economic growth potential; drive industrial restructuring and facilitate the development of new technology, new industries, and new business formats; inject new vitality into economic development, develop green finance, and boost sustainable economic and social development; support internationalization initiatives of Chinese enterprises, actively participate in global governance, increase China's overall competitiveness and international influence.

2.3.4 Equator Principles

Development financing plays a major role in the enforcement of international sustainable development through the conditioning of loans, typically via the Equator Principles (EP's). The Principles require compliance with the International Finance Corporation (IFC) Performance Standards and the World Bank Group Environmental, Health and Safety (EHS) Guidelines when developing projects in non-high-income Organization for Economic Co-operation and Development (OECD) countries. EP III was effective from 4 June 2013. Further to other ongoing principles, the EP III lays particular emphasis on energy management, transparency, as well as on human rights.

2.3.5 European Investment Bank

The European Invest Bank (EIB) is the European Union's bank. The EIB is a public institution driven by the policy objectives of the European Union and their principles of sustainable development, public participation, and accountability. The EIB requires the application of the precautionary principle through the mitigation hierarchy in order to promote more sustainable patterns of developments in the regions it operates in. The assessment of environmental and social impacts and risk, including their significance and materiality, as well as the development of adequate management plans and programmes are key tools for achieving sound environmental and social performance. In this respect, all EIB-financed operations shall comply with national legislation and international conventions and agreements ratified by the host Country. In addition, operations within the European Union (EU), Candidate and potential Candidate countries must comply with EU horizontal and/or applicable sectoral legislation while the operations outside the EU, candidate and potential Candidate countries must meet best international practice best international practice with regards to the assessment and management of environmental and social impacts and risks, promote good environmental and social governance and align with relevant EU principles and standards.

2.3.6 International Finance Corporation

The International Finance Corporation (IFC) first published its Performance Standards on Environmental and Social Sustainability in April 2006 to serve as comprehensive private sector standards available to international finance institutions. The revised performance standards were published in January 2012. The performance standards cover amongst others: assessment and management of environmental and social risks and impacts (PS1); labour and working conditions (PS2); pollution prevention and abatement (PS3); community health, safety and security (PS4); land acquisition and involuntary resettlement (PS5); biodiversity conservation and sustainable management of living natural resources (PS6); indigenous peoples (PS7) and cultural heritage (PS8). The IFC has also prepared an Environmental Health and Safety (EHS) Guideline for wind energy which includes information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as from the time of the environmental impact assessment, and continue to be applied throughout the construction and operational phases (IFC, EHS Guidelines for Wind Energy, August 2015).

2.3.7 Japanese International Cooperation Agency (JICA)

JICA was established in August 1974 and provides bilateral aid in the form of technical cooperation, Japanese Official Development Assistance (ODA) Loans and Grant Aid. JICA through its organisation has missions and strategies that aims to address a global agenda, reduce poverty through equitable growth, improve governance, promote human security, develop partnerships and enhance research and knowledge sharing.

2.3.8 KFW Development Bank

KFW Development Bank has been helping the German Federal Government to achieve its goals in development policy and international development cooperation for more than 50 years. In this regard, they are both an experienced bank and a development institution with financing expertise, an expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KFW finances and support programmes and projects that mainly involve public sector players in developing countries and emerging economies – from their conception and execution to monitoring their success. KFW has environmental and social standards that focus on water shortage, loss of biodiversity, demographic explosion, dwindling resources and climate change. These challenges all make it urgently necessary to forge tighter links between economic and ecological matters in the interests of sustainable development. KFW Development Bank is committed to the concept of sustainability, an economic system that safeguards the livelihood and quality of life for the coming generations, too. This is why KFW considers the promotion of ecologically sound, socially just and economically robust developments in partner countries to be its core task, and to drive change forward through "green growth".

2.3.9 Swedish International Development Agency (SIDA)

SIDA is a government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, SIDA contributes to implementing Sweden’s Policy for Global Development (PGU). SIDA works in order to implement the Swedish development policy that will enable poor people to improve their lives. Another part of their mission is conducting reform cooperation with Eastern Europe, which is financed through a specific appropriation. The third part of our assignment is to distribute humanitarian aid to people in need of assistance. SIDA has an environmental management system that focus on areas like; environmental assessment, biodiversity, indigenous peoples, involuntary resettlement, labour and safety, forests and safety of dams (World Bank 2015b). SIDA also guideline documents for climate change and environmental cooperation.

The Swedish government has a body called the Swedish Energy Agency which makes investments in Clean Development Mechanism and Joint Implementation projects (STEMFS 2012). The CDM projects will be paid on delivery of certified emission reductions. The CDM governing body makes the follow-up on these reductions very precise.

2.4 National legal requirements

Note: This section will present the applicable environmental and social legislation of the country where the wind power project is located. As a starting point, refer to the overview of national legislation for SAPP member countries (section 4) contained in the ESMF.

2.5 Responsible company corporate environmental and social policies

Note: This section will outline the responsible company's corporate environmental and social policy, guidelines, standards and operating policies.

3 Project categorisation

Note: This section presents the project category of the wind power project based on the likely environmental and/or social impacts. The categories of wind powered projects are presented below for reference purposes.

There are different types when defining wind powered plants, they are namely: remote wind power plants, hybrid wind plants, connected wind plants and wind farms.

The World Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,12 diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

b) **Category B**: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

d) (d) **Category FI:** A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

4 Construction Phase

During the construction phase of wind power projects various construction activities will take place. The section below outlines a list of the possible construction activities and proposed infrastructure for wind power projects.

<u>Note:</u> This section will present the construction activities and infrastructural requirements of the specific wind power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

4.1 Possible construction activities

The construction phase is likely to broadly involve the following activities:

- Establishment of security facilities;
- Establishment of the construction camp infrastructure (e.g. fencing, offices, safety and security signage, workshops, wash bay, waste management site, package sewage plant, water treatment facility, parking and storage areas);
- Establishment of laydown areas;
- Construction of access roads and establishment of traffic control measures (both on-site and on access roads to the site);
- Construction of bulk oil and fuel facilities, refuelling bay/s and bunding of these facilities;
- Construction of stormwater control facilities and erosion protection berms;
- Construction of medical facilities;
- Construction of wind power plant;
- Installation of fire management system;
- Installation of communications system; and
- Construction of truck holding area.

4.1.1 Establishment of security

Prior to the commencement of construction activities, the Contractor should establish the facilities for security management. These should include, but not be limited to:

- Establishing a security office;
- Training of security personnel;
- Fencing of key construction areas such as the plant, and base camp; and
- Setting up key access points.

4.1.2 Site establishment planning

Site establishment should take into consideration site specific plans related to occupational health, safety, environment and social management. The contractor needs to prepare a site establishment plan that details active construction areas that require setting up and management, detailing areas for cement mixing, material storage, laydown area, workshop, change rooms, worker assembly points and notice board. This plan should be informed by the engineering planning.

4.1.3 Safety management

Safety management at the site of the wind plant should comprise the following:

- Proper screening and background checks prior to the appointment of Contractors to check previous criminal offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety to address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education departments, NGOs and CBOs where appropriate, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly;
  - Practical construction measures (e.g. batching, using fire extinguishers etc.); and
  - Cultural sensitivity issues to address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

4.2 Management of construction activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from construction activities. The management measures identified in the ESIA for the wind power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of construction activities. Management control measures are listed in this section.

4.2.1 Control measures for security management

- Ensure contractors are aware of the safety rules and regulations set out by the company, (to be included as part of the contract) and that they abide by these rules;
- The safety of the construction site should not be lowered by construction work or construction-related activities, and contractors should remedy immediately any non-compliance and the effects thereof;
- Restrict the number of entry and exit points for security reasons;
- Erect a physical barrier (e.g. a removable fence) to ensure that there is no unauthorized access outside of the construction area; and
- Erect safety and security signage at the access points.

4.2.2 Control measures for clearing vegetation

- Prior to stripping of vegetation, prepare a vegetation clearing plan to determine the extent, phasing and management which will be applied by contractors;
- Demarcate areas that need to be cleared and based on the vegetation clearing plan. Contractors should not clear any vegetation outside of the areas defined by the stake markers;
- Cleared vegetation should be windrowed along the perimeter of the construction area to minimise erosion;
- Mark indigenous trees that should not be damaged by the contractors. The trees should be plotted on the survey drawings;
- Avoid forested areas;
- Avoid the burning of vegetation as far as possible. Where burning cannot be avoided, a method statement should be prepared for each controlled burn, and submitted to relevant company representative; and
- Reuse construction areas for the operational phase as far as possible to limit the fragmentation of natural landscapes.

4.2.3 Control measures for water quality and stormwater

- Onshore: the installation of turbine foundations, underground cables, access roads, and other ancillary infrastructure may result in increased erosion, soil compaction, increased run-off, and sedimentation of surface waters;
- Offshore: the installation of the turbine foundations and subsurface cables may disturb the marine seabed and may temporarily increase suspended sediments in the water column, thereby decreasing water quality and potentially adversely affecting marine species and commercial or recreational fisheries. Furthermore, the installation of the offshore structures may result in localized seabed erosion due to changes in water movements;
- Conduct a site selection process that considers the potential for interference of the plant's structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods;
- Control the use of jetting, bubble curtains, and sediment traps; undertake such activities in slack water (or on a tide that moves material away from the sensitive location) (IFC, EHS Guidelines for Wind Energy, August 2015);
- Develop and maintain an overall site Water Quality Plan for effective provision of freshwater for all on-site processes, operations, facilities and services for resident staff, contractors, subcontractors, based on best estimates of such requirements;
- Ensure that no natural surface water sources (i.e. streams, rivers, wetlands) are used; e.g. in situ to wash / clean plant or equipment, and/or for any water abstraction (other than for emergency firefighting);
- Minimise use of fresh water, prohibit water wastage, and train and encourage all staff to use water sparingly;
- Minimise impacts on natural watercourse areas, by taking all necessary precautions to ensure that construction activities do not alter natural ground and surface water quality or flows in areas identified as sensitive;
- Engineer solutions to the flow of groundwater where construction interacts with the flow of groundwater, to ensure that such flow is redirected in such a way that downstream impacts are minimised;
- Report on the groundwater monitoring;
- Conduct a site selection process that considers the potential for interference of the plant's structural components with commercial or recreational fisheries and marine species habitats;
- Plan the construction, installation, and removal of structural components, taking into account sensitive lifecycle periods; and
- A sewage and stormwater monitoring system will be established on-site by the lead contractor. The lead contractor will inform the Environmental Control Officer (ECO) of the appropriate sewage discharge standards, as required by or in accordance with the local regulations. Violation of these standards shall be a cause for the lead contractor to order the suspension of all effluent discharges, until such time that a suitable solution has been implemented.

4.2.4 Control measures for dust

- Control dust in the project area to minimize detrimental effects on sensitive environments;
- A scientifically based dust monitoring programme must as a minimum, include a schedule for dust suppression (spraying), speed limits for vehicles on unpaved roads, location and treatment of material stockpiles, the minimisation of the area disturbed at any one time and protection of exposed soil against wind erosion and a reporting mechanisms and action plan in case of excessive wind and dust conditions;
- Introduce dust abatement measures such as the use of water bowsers to wet down nearby road surfaces if necessary; and
- Minimise the area that needs to be cleared of vegetation.

4.2.5 Control measures for wetlands

- Consider drainage lines as no-go areas and assign a buffer zone as per the legislated requirements. Development should be restricted to the areas outside the buffer zone;
- Where needed, roads crossing the drainage lines should have properly constructed bridges (culverts or piping) to prevent damage to the drainage lines and to allow for free flow of water during rainfall events;
- Contractors to avoid erosion at all times. Erosion control measures should form part of the planning as well as the construction and implementation phases of the development;
- Avoid all pollution at all times. Special attention should be given to the prevention of pollution from crew camps and workshop, hydrocarbon and refuelling areas;
- Install stormwater management measures to direct avoid direct unpolluted water away from construction areas and infrastructure; and
- Design and construct crossings points in a manner prevents run-off from being trapped (i.e. avoiding thereby creating inundated areas) and to allow for free-flowing watercourse.

4.2.6 Control measures for biodiversity

- Consideration of the proximity of the proposed wind energy facility to sites of high biodiversity value in the region (including those located across national boundaries). Early screening can improve macro-level project site selection and the scoping of priorities for further assessment, thus reducing unnecessary biodiversity impacts and costs in the future. Sites of local, regional, and international importance may include: national and international protected areas (including marine protected areas), Important Bird Areas (IBA), Key Biodiversity Areas (KBAs), Alliance for Zero Extinction (AZE) sites, Ramsar sites (Wetlands of International Importance), known congregatory sites, and unique or threatened ecosystems. These sites may be known to be important migration routes, wetlands, or staging, foraging, or breeding areas; they may house bat hibernation areas and roosts; or they may contain important topographical features, including ridges, river valleys, shorelines, and riparian areas. Useful site selection tools can include: (i) strategic environmental assessments that compare the biodiversity and other environmental sensitivity of different wind resource areas; (ii) sensitivity (overlay) maps; (iii) digital resources that display areas of high biodiversity value; and (iv) zoning maps;
- With respect to offshore facilities, siting would include a review of areas of importance to the life history of marine life, notably fish, marine mammals, and sea turtles (e.g., feeding, breeding, calving, and spawning areas) or other habitats, such as juvenile/nursery habitats, mussel/oyster beds, reefs, or sea grass and kelp beds. Siting would also include a review of productive fishing areas; and
- Consultation with relevant national and/or international conservation organizations also helps to inform site selection for both onshore and offshore facilities (IFC, EHS Guidelines for Wind Energy, august 2015).

Biodiversity Surveys

- Site-specific issues: consideration of habitats, geographical location, topography, and vicinity of the wind energy facility to sites of high biodiversity value;
- Species-specific issues: surveys should be targeted to species of flora and fauna of high biodiversity value, those with a special international or national conservation status, endemic species, and species that are at elevated risk of impact from wind energy facilities. For example, species with a relatively high collision risk include certain soaring, aerial-displaying, and/or migratory birds and flocking birds, as well as birds of prey; and migratory, tree-roosting, and insectivorous bats. Species with a relatively high risk of visual disturbance include open-country species that instinctively avoid tall structures. Some species may be attracted to wind energy facilities as perches or feeding areas, which could further increase potential for collision. Species at risk of collision with associated transmission lines include relatively heavy-bodied birds with limited manoeuvrability (e.g., vultures, bustards, waterfowl, cranes, storks, pelicans, herons, flamingos), as well as flocking bird species. Species at risk of electrocution from associated transmission lines include various raptors, vultures, owls, and certain storks and other birds with large wingspans, and with behavioural tendencies to perch frequently on power lines and associated structures. Species with a relatively high risk of disturbance from underwater noise (at offshore wind facilities) include marine mammals (especially cetaceans) and certain pelagic

schooling fish species (e.g., herrings). These impacts and potential mitigation options should be assessed on a species-by-species basis;

- Season-specific issues: surveys should take into consideration certain periods during the year when the project site may have a greater or different ecological function or value (e.g., migration, breeding season, or winter seasons). Surveys should usually be conducted for at least one year when at-risk wildlife is identified. Longer surveys may sometimes be necessary in areas with exceptional aggregations of at-risk migratory birds and where existing biodiversity data are limited. This would be determined on a project-by-project basis;
- Surveys should be designed and implemented to adequately guide the micro-siting of turbines (and turbine selection) to minimize collision risks to birds and bats. This is normally expected to entail gathering relatively precise information on the spatial patterns of site utilization by at-risk wildlife species, as well as consideration of the locations of certain topographic, ecological, or other landscape features that may attract or otherwise concentrate the activity of flying wildlife within the project area and its surrounding landscape. Specific data-gathering methods and study designs should be selected based on site- and species-specific considerations, guided by technical experts, and may include vantage point surveys, point count surveys, ultrasound acoustic methods, remote-sensing data-gathering techniques, and/or other techniques to understand movement patterns, as appropriate. The extent of data collection should be commensurate with the biodiversity risk at the wind energy facility;
- The use and effectiveness of radar and/or other remote-sensing technologies in pre-construction studies should be evaluated on a project-by-project basis and may be appropriate to supplement observer-based surveys, depending on the circumstances.42 Remote-sensing technologies are particularly useful at offshore wind facilities, as observer-based studies are more difficult and expensive in the offshore environment;
- Surveys for bats could include an assessment of feeding and/or roosting habitats both within the project area and in its vicinity, activity surveys (transects) using hand-held ultrasound bat detectors, trapping and release surveys, and deployment of static ultrasound detectors (particularly at turbine locations). It is preferable for static detectors to be deployed at height and could be attached to meteorological masts;
- Depending on the location of the wind energy facility and on species-specific considerations, Collision Risk Modelling (CRM) may be also appropriate, especially when wind energy facilities are located close to areas of high biodiversity value. The utility of CRM is to be evaluated on a project-by-project basis with qualified experts. CRM is particularly useful at offshore wind farm facilities where empirical tools are limited; and
- Where multiple wind farm facilities are located in the same geographical area and near areas of high biodiversity value, wind project developers are encouraged to implement a coordinated approach to surveys and monitoring. This approach is cost-effective, as surveys could be jointly planned and implemented with costs shared between developers. A common survey methodology and approach also lends itself to cumulative impact assessment, as data collection methods and the level of effort could be standardized. Cumulative impact assessments should be undertaken in cases where multiple wind farms are located near areas of high biodiversity value (IFC, EHS Guidelines for Wind Energy, august 2015).

4.2.7 Control measures for soil and land capability

- Implement measures to avoid and minimise damage to soil resources and the ecosystem services they provide, including from depletion of organic matter, acidification, salinization, inappropriate agricultural practices/ over-grazing, vegetation clearance and spread of invasive vegetation;
- Carrying out vegetation clearing in the driest conditions possible;
- Avoid grass fires as they can result in soil degradation and erosion;
- Minimize the construction footprint and restrict construction activities to remain within this footprint;
- Establish vegetation and soil protection zones which are protected from construction activities including potential compaction impacts;
- Wind screening and stormwater control systems should be implemented to reduce/ prevent erosion from the project site;
- Prior to moving soil, prepare a scale drawing to showing where topsoil and subsoil will be stockpiled. Considerations for stockpiling of topsoil and subsoil include the following: avoidance of soil erosion; sedimentation of water courses; avoidance of areas prone to flooding; and appropriate size, height and method of forming stockpiles;

- Remove subsoil from all areas that will be disturbed by construction activities or to make way for haul roads, and stockpile;
- Store topsoil excavated from the site. This should be stored separate from wind rows or stockpiles of any other excavated materials to minimise loss from erosion or mixing with other materials;
- Protect and maintain soil stockpiles;
- Prior to construction ensure that any areas of soil that need to be protected from construction activities are clearly marked out by barrier tape and exclusion signs;
- Retain buffer vegetation and soils along waterways to reduce soil erosion and to promote long-term enhancement of soil biodiversity; and
- Re-establish indigenous vegetation on exposed soils as soon as possible.

4.2.8 Control measures for hazardous material

- Construct a bunded and fenced area for storage of hazardous materials, using the required safety equipment;
- Keep a record of hazardous substances stored on site. Clearly label all the containers storing hazardous waste;
- Store all hazardous materials in a clearing demarcated, bunded area in appropriate manner to prevent contamination of the site; and
- Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method.

4.2.9 Control measures for management of general waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest registered municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered municipal landfill site;
- Inspection and maintenance of waste management facilities; and
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using.

4.2.10 Control measures for archaeological impacts

- Conduct an archaeological ground-truthing survey of identified sensitive areas once the final layout of the wind plant and associated infrastructure has been determined;
- Inform construction managers and foremen before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites; and
- During the pre-construction phase, develop detailed designs of all crossings (e.g. power cables and/or internal roads) in consultation with a registered archaeologist.

4.2.11 Control measures for noise impacts

- Onshore construction noise should be limited to protect people living nearby;
- Noise-producing activities include blasting, piling, construction of roads and turbine foundations, and the erection of the turbines themselves;
- Limit noisy construction activities to working hours as required in terms of legislation and/or negotiated with local communities;
- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints from community members and landowners regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

4.2.12 Control measures for visual impacts

- Locate construction camp sites and laydown areas in low visibility, disturbed areas where possible;
- Use existing clumps of exotic/indigenous trees in the landscape to effectively screen camps and laydown areas;
- Minimise construction time, particularly where activities are exposed against the skyline. Materials, coatings and paints should be chosen based on minimal reflectivity where possible;
- Night time construction should be avoided where;
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency;
- Avoidance and minimization measures to address landscape, seascape, and visual impacts are largely associated with the siting and layout of wind turbines and associated infrastructure, such as meteorological towers, onshore access tracks, and substations;
- Consideration should be given to turbine layout, size, and scale in relation to the surrounding landscape and seascape character and surrounding visual receptors (e.g., residential properties, users of recreational areas/routes);
- Maintain a uniform size and design of turbines (e.g., type of turbine and tower, as well as height);
- Adhere to country-specific standards for marking turbines, including aviation/navigational and environmental requirements where available;
- Minimize presence of ancillary structures on the site by minimizing site infrastructure, including the number of roads, as well as by burying collector system power lines, avoiding stockpiling of excavated material or construction debris, and removing inoperative turbines; and
- Erosion measures should be implemented and cleared land should be promptly re-vegetated with local seed stock of native species.

4.2.13 Control measures for lifting operations

- Ensure all relevant information is known about the load, e.g., the size, weight, method of slinging, and attachment points;
- Ensure all lifting equipment (including load attachment points) is suitable, capable of supporting the load, in good condition, and in receipt of any statutory inspections required;
- Ensure all supervisors, equipment operators, and slingers are trained and competent in the lifting equipment and intended lifting techniques;
- Where possible, exclusion zones are to be established and maintained in order to prevent any unauthorized access to lifting areas; and
- When lifting large loads, ensure weather conditions are favorable for the task. Heavy lifting equipment typically has safe operating parameters included in its operating manual and these parameters should not be exceeded at any time (IFC, EHS Guidelines for Wind Energy, august 2015).

4.2.14 Control measures for climate change induced impacts

- Construct turbines able to operate with and withstand higher wind speeds, gusts, and direction changes;
- Install taller towers to capture stronger winds at higher altitudes;
- Choose sites that take into account expected wind speed changes during the lifetime of the turbines;
- Use vertical axis wind turbines (more output per m^2 of land area and can operate in wider range of wind speeds);
- Consider effects of extreme temperatures on turbine and blade selection and operation;
- Construct offshore turbines to withstand expected increases in wind–sea wave forces;
- Restore of coastal habitats such as mangroves, or the flood mitigation services provided by wetlands as measures against storm surges, coastal erosion and flood risk;
- Implement water control measures to deal with water pollution and account for the potential impact of climate change on water resource quality;
- Develop restoration programs and devise effective adaptation techniques for threatened ecosystems and species;

- Construct artificial water storage facilities as well as use natural water systems to increase water storage. Water storage is essential to ensure reliable sources of water for irrigation, water supply and to provide a buffer against floods;
- Identify new groundwater sources and secure appropriate groundwater recharge. Groundwater provides a cushion against drought and increasing uncertainty in surface water availability; and
- Use a range of methods and techniques such as desalination, wastewater reuse and green water to diversify and improve water supply sources to reduce climate vulnerability.

5 Operational Phase

Note: This section will present the operational activities of the specific wind power project. The plan should be tailored to meet the specific requirements of regulators and lenders.

During the operational phase various operational activities will take place. The section below outlines a list of the possible operational activities and generic control measures.

5.1 Possible operational activities

The operational phase is likely to broadly involve the following activities:

- Maintain and monitor security facilities;
- Day to day management and maintenance of wind plant facilities;
- Operate and maintain water and waste management systems;
- Servicing and maintenance of wind panels;
- Undertake monitoring air quality, noise, biodiversity and occupational, health and safety issues; and
- Ensure facilitation of proactive engagement with stakeholders.

5.2 Management of operational activities

Note: This section presents the measures for mitigating and managing environmental and social impacts arising from operational activities. The management measures identified in the ESIA for the wind power project should be featured.

The company and its site contractor are required to manage the environmental and social impacts of operational activities. Management control measures are listed in this section

5.2.1 Control measures for water quality

- Institute and utilise appropriate water saving measures and technologies to minimise water use;
- Minimum disturbance to be caused to existing topography during preconstruction and construction;
- Water discharging to the environment during all project phases (and to include water and sewage treatment works, as well as water from washing of panels) to comply with relevant water quality standards;
- Ensure legislative requirements are met for sanitation;
- Clean and dirty water is to be separated at point source; and
- Place hessian/geofabric attached to rows of stakes to prevent sediment washing downstream of the site during operation.

5.2.2 Control measures for the protection of biodiversity

- Operation phase biodiversity monitoring (post-construction monitoring) is essential for (i) confirming the predicted bird or bat mortality and recording unexpected mortality; (ii) enabling adaptive management of the wind energy facility; (iii) better predicting the impacts of additional turbines in the same geographical area; and (iv) advancing scientific knowledge for future wind energy developments. The extent and design of operation phase biodiversity monitoring programs should be informed by site-specific, species-specific, and season-specific risks, as identified during baseline surveys, impact assessments, and/or collision risk assessments;
- Monitoring programs should be designed to measure the rate and the taxonomic composition of bird and bat fatalities that are occurring at the facility and the effectiveness of mitigation measures,

most notably curtailment strategies and on-demand shut-down procedures, and other experimental mitigation measures. Following an adaptive management paradigm, the implementation of mitigation measures may be augmented, diminished, or eliminated, depending on their demonstrated effectiveness. Monitoring programs should be focused on species of heightened concern as defined by the pre-construction assessment;

- Assessment of collision-related impacts to bats and birds at land-based wind energy facilities is normally expected to include post-construction carcass searches. Depending on the type and extent of biodiversity risk at the wind energy facility, such searches should be conducted for a minimum of one to three years subsequent to the initiation of wind farm operation, and may be extended to longer durations in high-risk environments, if necessary;
- Post-construction carcass searches and evaluation should incorporate current scientific design elements79,80,81 to ensure that the resulting estimates of bird and bat fatality rates at the facility are accurate and robust, such as the following: 1) correction for searcher efficiency (carcass detection) bias; 2) correction for carcass removal by scavengers; 3) correction for unsearched areas; 4) selection of appropriate carcass search frequency based on expected fatality and carcass scavenging rates; 5) selection of subsample of turbines to be searched, as appropriate, depending on size of project and expected fatality rates; 6) selection of search area size and configuration at searched turbines depending on substrate search ability and analytical considerations;
- In certain circumstances, post-construction monitoring may also include further surveys of the use and movement patterns of birds and bats through the project area to supplement data gathered by carcass searches;
- Where multiple wind farm facilities are located in the same geographical area and close to areas of high biodiversity value, wind project developers are encouraged to implement common post-construction monitoring procedures so that results can be assessed cumulatively. A common data-sharing and reporting mechanism would facilitate this process;
- Wind farm developers are also encouraged to make post-construction monitoring results available to relevant stakeholders; and
- Offshore wind energy facilities should be monitored both temporally and spatially for parameters, including benthic organisms, mammals, and fish. Parameters may include infauna (sediment and infaunal communities); hard substrate habitat; fish; sand eel (indicator species of changes to sediment characteristics); birds and bats; and marine mammals (IFC, EHS Guidelines for Wind Energy, august 2015).

5.2.3 Control measures for aviation

- Consult with the relevant aviation authorities before installation, in accordance with air traffic safety regulations; and
- When feasible, avoid siting wind energy facilities close to airports and within known low-flying areas or flight paths. Cumulative impacts associated with the number of existing wind energy facilities within, or in close proximity to, low-flying areas or flight paths should be a consideration in siting turbines. Use anti-collision lighting and marking systems on towers and/or blades and consult with the relevant aviation authorities to determine appropriate lighting and marking requirements in line with national standards. In the absence of national standards, refer to good practice guidance (IFC, EHS Guidelines for Wind Energy, august 2015).

5.2.4 Control measures for aviation radar

- Consider wind energy facility design options, including geometric layout, location of turbines, and changes to air traffic routes;
- Consider radar design alterations, including relocation of the affected radar, radar blanking of the affected area, or use of alternative radar systems to cover the affected area; and
- Consultation should be undertaken with the relevant aviation authorities to determine prevention and control measures (IFC, EHS Guidelines for Wind Energy, august 2015).

5.2.5 Control measures for hazardous material

- All hazardous material should be appropriately separated and stored in designated signed areas, with appropriate demarcation and entry restrictions. Where appropriate, petrochemicals and other hazardous liquids should be stored in contained areas, surrounded by berms or concrete containment, so as to restrict the movement of hazardous substance into the terrestrial or aquatic environments in the event of spills or leaks;

- A Spill Contingency Plan should be prepared for all hazardous materials and should be submitted to the competent authority for approval;
- Explosives and other flammable materials should be stored in clearly labelled designated areas, and explosives should be stored in a building made of reinforced concrete and surrounded by a berm;
- All fuel tanks should be contained within a berm wall of reinforced concrete and properly sealed to prevent leaks in the event of an accidental spill. The containable spill volume should be at least 120% of the volume of the largest tank. An oil/water separator should be fitted to the outlet valve; and
- All spills of hazardous materials should be immediately reported to the competent authority and measures taken to contain the spill and remediate the area.

5.2.6 Control measures for management of waste

- Compile a waste management plan to handle appropriate waste storage and disposal;
- Ensure compliance of relevant waste management as per in country and other relevant standards;
- All work sites must be kept free of waste;
- No solid waste may be burned or buried on site or disposed of by any other method on site. Solid waste must be disposed at the closest municipal landfill site. Slips of disposal to be retained as proof of responsible disposal;
- All batteries must be disposed at a registered landfill site;
- The responsible company must look into options of donating/ reusing old PV panels that they are no longer using; and
- Inspection and maintain the waste management facilities.

5.2.7 Control measures for management of traffic impacts

- No unauthorised persons should be allowed onto the site;
- All vehicles accessing the site should adhere to a low speed limit to avoid collisions with susceptible species that are common to the area;
- Compile and implement a traffic management plan for the site to ensure that no hazards would result from the possible increase in traffic;
- Enforcement of traffic control measures (both on-site and on access roads to the site where applicable);
- Develop and put into effect a code of conduct for employees;
- Inspection and maintenance of access road where applicable; and
- Ensure that there is clear traffic signage on site.

5.2.8 Control measures for noise impacts

- Noise generated from wind energy facilities tends to increase with the speed of the wind, as does overall background noise due to the friction of air over existing landscape features. Increased wind speeds may also mask the noise emitted by the wind energy facility itself, and wind speed and direction may affect the direction and extent of noise propagation. The application of noise guideline values and the assessment of background levels should therefore take these factors into consideration. It is considered good practice to undertake noise compliance testing when the plant becomes operational to verify the modelled noise levels at nearby properties and confirm the appropriateness of any mitigation applied;
- Measures to prevent and control noise are mainly related to engineering design standards and turbine siting. With modern turbines, mechanical noise is usually significantly lower than aerodynamic noise, and continuous improvement in air foil design is reducing the latter;
- Operating turbines in reduced noise mode;
- Building walls/appropriate noise barriers around potentially affected buildings (only an option in hilly terrain, due to the height of turbines);

- Implement noise dampening measures for noise generating equipment to ensure that the increase in ambient noise level complies with relevant norms and standards;
- Establish a mechanism to register complaints regarding noise and other construction activities; and
- Complaints should be responded to as a matter of urgency and measures must be taken to minimize the noise.

5.2.9 Control measures for fire

- An emergency fire plan to be developed with emergency procedures in the event of a fire;
- Provide personnel with appropriate PPE (appropriate gloves, safety glasses/face shield, appropriate clothing) and be trained to avoid exposure to electrolyte solutions;
- Maintain safety and security signage at strategic locations around the site;
- Should electrolyte solutions be stored on-site, these should be stored away from incompatible reactant materials such as all peroxides, chemicals that react with acid to generate a gaseous product, strong reducing agents, reactive metals and some carbides; and
- Ensure that batteries are placed in well-ventilated areas, ensuring adequate temperature control instruments are constructed with the facilities (in the case of solid state batteries).

5.2.10 Control measures for climate change induced impacts

- Develop meteorology-based weather/ climate forecasting;
- Develop and implement land management practices such as improved native forest management, establishing tree plantations, and revegetation programs, especially on cleared land to ensure carbon sequestration. Minimizing human disturbance for maximising carbon storage and conserving forest biodiversity;
- Establish and effectively manage protected-area systems to ensure the continued delivery of ecosystem services that increase resilience to climate change;
- Develop and implement sustainable water management practices where river basins, aquifers, flood plains and their associated vegetation provide water storage and flood regulation; and
- Develop and implement sustainable management practices of grasslands and rangelands, to enhance pastoral livelihoods.

5.3 Prevention of diseases

Note: This section sets out the measures for preventing disease among fulltime and contracted plant staff and communities. The key risk areas will be highlighted in the ESIA for the specific wind power project. Diseases that are highly prevalent include: malaria and HIV/AIDS.

5.3.1 Malaria

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Provide workplace and/or community awareness about malaria;
- Avoid and minimize standing water which could provide breeding of mosquitoes;
- Distribute repellents and insecticide-treated bed nets to employees and their families;
- Provide access to artemisinin-based combination therapy (ACT) treatment in-house or through health services;
- Engage the local community in planning, advocacy and implementation;
- If feasible, conduct/arrange for indoor residual spraying (IRS) of employee homes;
- Employ environmentally conscious practices to reduce concentration of larvae and mosquitoes;
- Impact reporting, external advocacy and participation in malaria platforms; and

- Suitable clothing (workers are required to wear long sleeve shirts and long pants, closed shoes, these are standard issues for field clothing), bed nets and personal sprays etc.

5.3.2 HIV/ AIDS

- Identify malaria as a corporate priority;
- Include malaria in the company's wellness and health benefits strategy and program;
- Support programs to provide condoms to all employees and at-risk populations;
- HIV testing regularly proposed to employees. HIV results are kept confidential;
- Support awareness-raising campaigns on HIV/AIDS prevention, diagnosis, and treatment to reduce the stigma of the disease among local communities; and
- Identify capacity building opportunities where feasible to support the local communities' activities.

6 Management of contractors and workers

6.1 Contractor Management

Implement relevant lender institutions principles guiding contractor management pertaining to labour and working conditions.

6.1.1 Screening and induction

- Proper screening and background checks should be undertaken before Contractors are appointed to check previous social offences. Anyone with a record of such offences should not be hired;
- Contractor inductions should be undertaken before commencing with construction in relation to:
  - Community health and safety: To address social pathologies in neighbouring communities through promoting education and awareness programs for Contractors. Similarly, communities should also receive training relating to these aspects. These training programs should be developed in consultation with local government health departments, education Departments, NGOs and CBOs, and should be targeted more to the vulnerable groups of society, i.e. children, women and the elderly; and
  - Cultural sensitivity issues: To address Contractor behaviour in relation to community resources and assets and prevent utilization of such by the contractors.

6.1.2 Accommodation

- The responsible company should ensure that accommodation meets requirements as per the lender guidance note on Workers' Accommodation;
- Contractors should be accommodated in dedicated fenced off construction camps, with all facilities and amenities far away from the communities; and
- Proper access control measures should be implemented to prevent unauthorised people entering the construction camp and to monitor movement of Contractors into and out of the construction camp. Contractors should not be allowed visitors at the construction camp.

6.1.3 Code of conduct

- There needs to be a Code of Conduct to which Contractors should adhere at all times. This should cover the following issues:
  - Relationships with the surrounding communities - violence towards communities, unauthorised use of community assets and resources etc;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed;
- Measures should be based on the national or international labour principles; and
- An ongoing community education programme, to include the grievance process and community member's rights, should be implemented.

6.2 Communication and labour relations

Note: This section sets out the measures for maintaining communication channels with external stakeholders and ensuring labour relations. The plans and procedures should be tailored to meet the requirements of national laws and lenders safeguard policies and standards for the coal fired power project.

With respect to labour relations, a company constructing and operating a coal fired power plant will need to apply labour practices that are fair and non-discrimination, provide equal opportunity and do not make use of child or forced labour. A key component of maintaining good labour relations is a code of conduct. Key items that the responsible company must comply with are as follows:

- Non-Discrimination and Equal Opportunity;
- Fair labour practice;
- Harmful child labour;
- Forced labour; and
- Non-Employee Workers, Contract Labour and Supply Chain.

6.2.1 Code of conduct

- Develop and implement a code of conduct for contractors and company employees. The code of conduct should cover the following issues:
  - Relationships with the surrounding communities- violence towards communities, unauthorised use of community assets and resources etc.;
  - Sexual misconduct; and
  - Drug and alcohol abuse.
- Implement stringent measures should be put in place to address offenders and this should form part of the employment contract and should be agreed upon before the employment contract can be signed; and
- Implement an ongoing community education programme to include the grievance process and community member's rights.

6.2.2 Grievance procedure

- Implement a grievance procedure for all stakeholders (e.g. communities, landowners, employees) to ensure that issues are quickly reported on and promptly acted upon by contractors and/or company representatives;
- The dedicated grievance procedure should take the following into consideration:
  - Location for lodging of grievances;
  - Cut-off time for grievances to be lodged, e.g. within 24 hours of the incident happening;
  - Turn-around time for the grievances to be addressed, and identification of designated person to provide feedback; and
  - Assessment of legitimacy of the grievance, with the need for witnesses to be defined.
- A grievance mechanism must be in place for employment related queries and unrest. Where prospective employees demonstrate dissatisfaction in the manner in which their applications were handled, there needs to be a process of communicating this dissatisfaction through the established grievance mechanism (national legislation may set out the procedures for handling of employee grievances).

7 Occupational health and safety

Note: This section presents the requirements for occupational health and safety during construction and operation of the wind power project. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit. A dedicated standalone plan may be prepared for occupational health and safety.

- All staff should undergo a general health and safety induction;
- Develop and implement an occupational health and safety system that comprises the following key elements:
  - Standard operating procedures (SOP) and guidelines;
  - Local work instructions; and
  - Reference documents/training materials.
- Communicate general health and safety rules to workers during the site orientation/induction; and
- Enforce general health and safety rules at the site.

7.1 Risk management

- Conduct a risk assessment of construction and operational activities to determine the potential risks that may arise; and
- The risk assessment must inform:
  - Awareness management;
  - Management tools;
  - Inspections of tools; and
  - Re-assessment of activities and tasks.

7.2 Personal protective equipment

- Personal protective equipment (PPE) must be worn by all employees and contractors when onsite; and
- Employees and contractors must receive proper training before receiving their PPE.

7.3 Traffic safety

During the construction phase traffic will be very busy. Therefore, it is important to ensure that appropriate traffic management are in place.

7.4 Traffic safety induction

- Safety induction for the drivers and employees should provide adequate information, training and instruction. Refer to section 4.1.3 for safety management;
- All workers should have the necessary training, qualifications or licenses to operate the vehicles, plant equipment and attachments they use;
- Access to such vehicles should be managed, with the driver signing for the vehicle in use;
- All workers need to know and understand the traffic rules, plant and community safety policies, and traffic safety procedures, any restrictions on vehicle size or type. Any site-specific health and safety rules and the arrangements for ensuring that all persons at the workplace are informed of these rules must be included in the management plan;
- Training in terms of the incident reporting should be provided during the inductions, providing information relating to:
  - Prioritisation of urgent medical treatment for people injured before reporting the incident;

  - Who should be informed of incidents;
  - How the incident should be reported; and
  - What the time limits for reporting incidents and feedback are.
- Safety training for the surrounding communities, schools and community amenities should include:
  - Identification of a liaison point(s) for community facilities such as schools, clinics and community centres through which to disseminate information to communities; and
  - Suitable means of dissemination of information including pamphlets, fliers, radio announcements and skits at schools.
- Community training on the incident and grievance reporting mechanism must be made widely available to communities including at public places such as schools, police stations, clinics, community centres, on laminated sheets to ensure that it is readily available when required. This must at a minimum note:
  - Who should be informed of an incident;
  - How should incidents should be reported; and
  - What the time limits for reporting incidents and feedback are.

7.5 Occupational health and safety hazards of a wind power plant

Occupational health and safety hazards specific to wind energy facilities and activities primarily include the following:

- Working at Height;
- Working over Water;
- Working in Remote Locations;
- Lifting Operations; and
- Public Access.

7.5.1 Working at height and protection from falling objects

Working at height occurs frequently throughout all phases of operation at any wind energy facility, and is especially relevant for maintenance purposes. The main focus when managing working at height should be the prevention of a fall. However, additional hazards that may also need to be considered include: falling objects and adverse weather conditions (wind speed, extreme temperatures, humidity, and wetness). Managing working at height activities requires suitable planning and the allocation of sufficient resources. Preferred mitigation methods may include, in this order:

- Eliminate or reduce the requirement to work at height. During the planning and design phases of an installation, specific tasks should be assessed with the aim of removing the need to work at height, if practicable. Examples of this would include assembling structures and carrying out ancillary works at ground level, then lifting the complete structure into position to the extent that is feasible and cost effective;
- If working at height cannot be eliminated, use work equipment or other methods to prevent a fall from occurring. Collective protection systems, such as edge protection or guardrails, should be implemented before resorting to individual fall arrest equipment. In addition, safety nets or airbags can be used to minimize the consequences of a fall should it occur;
- Ensure all structures are designed and built to the appropriate standards, and have the appropriate means of working-at-height systems fitted;
- Suitable exclusion zones should be established and maintained underneath any working-at-height activities, where possible, to protect workers from falling objects;
- Ensure all employees working at height are trained and competent in the use of all working-at-height and rescue systems in place;
- Provide workers with a suitable work-positioning device; also ensure the connectors on positioning systems are compatible with the tower components to which they are attached;
- Ensure that hoisting equipment is properly rated and maintained and that hoist operators are properly trained;

- When working at height, all tools and equipment should be fitted with a lanyard, where possible, and capture netting should be used if practicable;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on elevated structures;
- Avoid conducting tower installation or maintenance work during poor weather conditions and especially where there is a risk of lightning strikes; and
- An emergency rescue plan should be in place detailing the methods to be used to rescue operatives should they become stranded or incapacitated while at height (IFC, EHS Guidelines for Wind Energy, august 2015).

7.5.2 Working over water

Prevention and control measures associated with working over open water include the basic principles described for working at height, as above, in addition to the following:

- Complete a risk assessment in order to develop a safe system of work for all working-over-water tasks and allocate appropriate resources to mitigate the hazards;
- Ensure all operatives are trained and competent in all tasks they are expected to undertake and in using all equipment, including Personal Protective Equipment (PPE) they are expected to operate;
- In addition to standard PPE, as noted above, use approved buoyancy equipment63 (e.g., life jackets, vests, floating lines, ring buoys) when workers are over, or adjacent to, water where there is a drowning hazard;
- Where exposure to low water temperatures is likely to lead to the onset of hypothermia, control measures such as survival suits must be implemented;
- When buoyancy equipment is being used with working-at-height fall-arrest equipment, these systems should be compatible;
- Train workers to avoid salt spray and contact with waves; and
- Allow the provision of appropriate rescue vessels with qualified operators and emergency personnel, if required (IFC, EHS Guidelines for Wind Energy, august 2015).

7.5.3 Working in remote locations

Planning is vital in ensuring the safety, health, and welfare of employees when operating in remote locations, especially in offshore sites. Areas to consider when planning for remote working include:

- Suitability of communication equipment available for the work crew;
- The training and competence of personnel working remotely and the readiness of all necessary safety equipment in the location;
- Supervision by competent personnel empowered to make decisions based on events and conditions at the work location;
- Means for managers to track the exact location of the working crew;
- Local emergency plan in place; and
- Provision of suitably qualified first-aid-trained personnel in the work crew (IFC, EHS Guidelines for Wind Energy, august 2015).

7.5.4 Lifting operations

Lifting operations are an integral component of the construction of any wind energy facility. During the construction phase, components are typically assembled and transported to the site where assembly will take place. This involves using large, complex pieces of lifting equipment to lift loads of varying dimensions and weights numerous times

The lifting requirements during the construction of an onshore wind facility are similar to those of any other construction projects, however when lifting operations are required in an offshore environment the lifts can become a very complex operation, involving multiple vessels and cranes. This can create a number of additional hazards, including: sea states that can affect the stability of the lifting platforms, a marine environment that can accelerate the degradation of lifting points on components, and communication problems between multinational crews on separate vessels carrying out the lift.

The management of lifting operations requires the use of competent personnel, thorough planning, effective communication, and a high level of supervision when carrying out a lift. Consideration should be given to the following areas:

- Ensure all relevant information is known about the load, e.g., the size, weight, method of slinging, and attachment points;
- Ensure all lifting equipment (including load attachment points) is suitable, capable of supporting the load, in good condition, and in receipt of any statutory inspections required;
- Ensure all supervisors, equipment operators, and slingers are trained and competent in the lifting equipment and intended lifting techniques;
- Where possible, exclusion zones are to be established and maintained in order to prevent any unauthorized access to lifting areas; and
- When lifting large loads, ensure weather conditions are favorable for the task. Heavy lifting equipment typically has safe operating parameters included in its operating manual and these parameters should not be exceeded at any time (IFC, EHS Guidelines for Wind Energy, august 2015).

7.5.5 Public access

Safety issues may arise with public access to wind turbines (e.g., unauthorized climbing of the turbine) or to the wind energy facility substation. Any public rights of way located within and close to the wind energy facility site should be identified prior to construction in an effort to establish any measures that may be required to ensure the safety of their users. Prevention and control measures to manage public access issues include:

- Use gates on access roads;
- Where public access is not promoted to the site and/or there are no current rights of way across the site, consider fencing the wind energy facility site, or individual turbines, to prohibit public access to the turbines;
- Provide fencing of an appropriate standard around the substation with anti-climb paint and warning signs;
- Prevent access to turbine tower ladders; and
- Post information boards about public safety hazards and emergency contact information (IFC, EHS Guidelines for Wind Energy, august 2015).

8 Influx management

Note: This section presents some of the requirements for influx management during construction and operation of the wind power plant. The content will be informed by relevant national laws, lender requirements, corporate safety rules and special conditions set out in the environmental authorisation and/or permit.

A common impact of major projects in developing countries is the influx of job seekers. The influx may be motivated by expectations around the project itself, or it may be the result of a more general perception of opportunity in a town or a region. This plan sets out the responsible company's contribution to the mitigation of the negative impacts associated with uncontrolled influx.

9 Cultural heritage management and chance find procedure

Note: This section presents the requirements for management of archaeological and cultural heritage that is located on the project site. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. Depending on the sensitivity of the project area, it may be necessary to develop a standalone cultural heritage management plan.

9.1 Summary of chance find procedure

During construction, if any possible finds such as stone tool scatters, ceramics or bone and fossil remains are made, the following steps must be taken:

- Appropriate communication channels should be in place when chance finds are made. It will include line management from the construction worker on the ground to the direct supervisor who will report the find to the environmental officer who will have the contact details of a heritage specialist;
- A heritage specialist must be contacted immediately to assess the significance of the finds as soon as possible to prevent any delays to the project;
- Construction activities in this area should cease until the site is cleared by the heritage specialist;
- The plant infrastructure should be aligned to avoid known grave sites and sites which otherwise has cultural significance;
- Contractors should take note of identified cultural heritage sites and take measures to ensure that these areas are not disturbed by the construction teams;
- Contractors should make provision for accidental discovery of archaeological sites and graves within the project area. In the event of a chance find and immediately notify the responsible companies who must ensure that a chance find procedure is implemented;
- Removal of cultural heritage should be avoided unless:
  - There are no technically or financially feasible alternatives to removal;
  - The overall benefits of the project outweigh the anticipated cultural heritage loss from removal; and
  - Any removal of cultural heritage is conducted by the best available technique.
- Prepare and implement a chance find procedure that includes the following requirements:
  - Employees and contractors should be notified that archaeological sites and/or graves/cemeteries may be exposed during the construction activities;
  - Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, should cease immediately and the designated HSE office bearer or their appointee should be notified as soon as possible;
  - All discoveries should be reported immediately to the relevant authorities, so that an investigation and evaluation of the finds can be made; and
  - Artefacts should not be removed, destroyed or interfered with by anyone on site.
- For sites that may be found to occur within infrastructure footprints and cannot unavoidably be damaged through construction activities, the following should be undertaken:
  - In collaboration with affected stakeholders, develop relocation program for all graves and other objects that can be relocated or reconstructed. Relocation should include 1) identification and development of new locations to accommodate the displaced objects and 2) culturally-appropriate ceremonies for the removal and transfer of graves, sacred sites and other objects; and
  - Appropriate time and resources should be provided to allow for salvaging and studying of findings.

10 Resource efficiency

Note: This section presents the management measures to ensure the efficient use of resources. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

During any construction phase a variety of resources (e.g. water, energy) will be utilised. These resources need to be managed efficiently as follows:

- Minimise water use;
- Implement energy saving measures;
- Avoid wasteful use of materials;
- Source goods and services locally were possible; and
- Minimise the generation of waste by applying the waste hierarchy.

11 Reporting, monitoring and auditing

Note: This section sets out the process for reporting, monitoring and auditing of environmental and social management at the wind power project. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit. It should be noted that these elements form an iterative cycle which must result in ongoing improvement in management measures.

11.1 Reporting

The responsible company needs to set up a reporting template for contractors and staff. This template should outline the following:

- Clearly set out roles and responsibilities for contractors and their environmental/social management team;
- Develop key performance indicators;
- Prepare regular reports on the environmental and social performance of the wind plant;
- Hold regular meetings with the responsible agencies to report on environmental and social performance and non-conformance during the construction and operational phases, where required; and
- Hold regular meeting with the communities to inform them on project progress and/or operation. Provide a platform for issues to be raised and to provide feedback on resolution of grievances.

11.2 Monitoring

The responsible company needs to monitor its environmental and social indicators. Monitoring results must be structured and presented for review on an ongoing basis so that if objectives and targets are not met, corrective action can be taken.

- Prepare and implement an environmental and social monitoring plan that contains the following:
  - Material impacts;
  - Indicators that are measurable and auditable;
  - Receptors that may potentially be impacted;
  - Location of monitoring;
  - Type of monitoring, e.g. air, water quality, noise and biodiversity;
  - Frequency monitoring activities; and
  - Responsible person for monitoring.

11.3 Auditing

- Implement an on-site verification audit program to define scheduling, conducting, and documenting of internal and external health, safety and environment audits;
- Ensure that the audit system focuses on:
  - Avoiding recurrence of non-conformances;
  - Ensures timeous corrective actions;
  - Performs follow ups with site management to ensure that non-conformance are corrected and recommendations are implemented within required timeframes;
  - Report any areas of non-compliance to corrective actions to the plant manager and/or relevant management structure; and
  - Ensures methodical record-keeping.

12 Training and environmental awareness

Note: This section presents the training requirements for employees and contractors. The content will be informed by relevant national laws, lender requirements, corporate policies and special conditions set out in the environmental authorisation and/or permit.

- Develop and Environmental, Social Management System (ESMS) to help manage the responsible company's environmental and social impacts efficiently and effectively and to improve environmental and social stewardship across the entire organisation;
- Ensure that all employees, contractors and visitors receive the responsible company's induction training before entering the plant;
- Develop an Environmental, Health and Safety (EHS) system to:
  - Plan and document the responsible company's overall EHS aims and objectives in a policy statement, identify and register environmental aspects and impacts and occupational health and safety risks as well as regulatory requirements;
  - To define EHS objectives and targets, implement suitable strategic initiatives to deliver results in accordance with the responsible company's EHS policy and legal requirements;
  - Check, monitor and measure the results against policy, objectives, targets and legal and other requirements; and
  - Take action to continually improve the performance of the EHS management system.
- Conduct regular toolbox talks with the employees and contractors.

12.1 Environmental Awareness

Environmental awareness measures must be developed by the responsible company, it should describe the manner in which the company intends informing its employees of any environmental risks which may result from their work and the manner in which the risk must be dealt with to avoid pollution or degradation of the environment.

Environmental conditions are included in any operational contracts, thereby making Contractors aware of the potential environmental risks associated with the project and the necessity to prevent accidental spillages by the implementation of good housekeeping practices.

The following principles should apply to safety, health and environmental (SHE) training:

- All personnel as a minimum undergo general SHE induction and awareness training;
- An ESMS coordinator has been appointed;
- The ESMS coordinator should identify the SHE training requirements for all the responsible company personnel and Contractors. The training requirements are recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and Contractors; and
- The training matrix is administered by the responsible company.

12.1.1 Awareness

General awareness training should be conducted as follows:

- Everyone should undergo induction on entry which should, to incorporate environmental awareness training. At the end of this training, personnel should be required to complete the competency test and the level of competency assessed by the Training Department. Re-testing or induction will be undertaken during inspections and/or audits and/or as necessary and renewed on an annual basis;
- Evaluation of competency training, where required, should be carried out through tests and questionnaires for employees; and

- All personnel performing tasks which can cause significant or major environmental impacts should be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

In addition to the above environmental awareness, environmental issues should be addressed as follows:

- Induction on environmental issues for all employees starting to work on the plant; and
- Annual induction for all employees.

12.1.2 Training

- Awareness training must include the potential consequences of departure from specified operating procedures as well as significant environmental impacts, actual or potential, of their work activities;
- Training should be appropriate to the activity of individual employees; and
- Monthly environmental topics should be generated to raise awareness of employees on environmental issues.

12.2 Responsible company structure for environmental and social management

Note: This section presents the roles and responsibilities of company official structures, staff and/or representatives regarding the implementation the environmental and social management plan. The management structure of the operating company will determine how roles and responsibilities are assigned for a specific wind power project.

Below are key staff that are usually responsible for the management of environmental and social issues during the construction and operational phases of the project. This is an example of a generic company management structure and associated roles and responsibilities of the designated company representatives. This will be updated accordingly by the responsible company.

12.2.1 Board and/or governing body

- Approve policy and strategy related to the SDP;
- Provides oversight of sustainability management;
- Ensure the company governance is transparent and decision-making meets good governance principles;
- Oversee the production and disclosure of a public annual report on sustainability performance to stakeholders; and
- Ensure that the company's risk strategy, policy and management incorporate sustainability issues, both positive and negative.

12.2.2 Managing Director

- Primarily oversee the operations and performance of the organisation as directed by the board of directors;
- Responsible for the strategic leadership in the business in collaboration with the board; and
- Manage the company's compliance with legal and regulatory requirements.

12.2.3 Sustainability and/or Environment Manager

- Develop and manage the implementation of a broad-based sustainability strategy and plan;
- Integrate the sustainability strategy throughout the responsible company;
- Ensure that the sustainability strategy and plan enhances business performance and supports the long-term interests of the company;
- Develop and implement the ESMS that adheres to local, national and international standards;

- Manage the support team of environmental, health and safety and community officers to implement the ESMS;
- Ensure compliance with relevant environmental legislation;
- Prepare monitoring reports for submission to the General Manager and to stakeholders and the relevant authority;
- Ensuring integration of environmental and social functions throughout the operation;
- Ensure implementation of the Grievance Management Procedure;
- Implement environmental policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs and awareness for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal service;
- Management of the environmental related components of the grievance mechanism;
- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results;
- Assistance with the preparation of environmental monitoring reporting and permit applications;
- Compile GRI data for inclusion in the annual report;
- Conduct environment risk assessment for the operation;
- Ensure that there is adequate capacity to implement sustainability and environmental management functions and responsibilities; and
- Outsource functions as required to meet obligations and ensure compliance.

12.2.4 Health and Safety Officer

- Implementation of health and safety policies, procedures and management plans, notably the workplace health and safety plan;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Ensure compliance with relevant health and safety legislation;
- Planning of and carrying out safety training programs for employees and contractors;
- Obtaining and maintaining all necessary safety permits;
- Management of the safety related components of the grievance mechanism;
- Inspections/audits of safety requirements by employees and sub-contractors;
- Sampling and data capture in accordance with safety monitoring program and analysis of results; and
- Assistance with the preparation of reporting and permit applications.

12.2.5 Community Liaison Officer

- Implementation of social policies, procedures and management plans, notably the Stakeholder Engagement Plan, the social components of the ESMP;
- Planning of and carrying out social and stakeholder engagement training programs for employees and contractors;
- Developing and maintaining relationships with local community stakeholders and in particular coordinate the Stakeholder and Community Forum in collaboration with stakeholders;
- Establishment and overall management of the grievance mechanism in conjunction with the environmental, and health and safety coordinators, and in liaison with the Human Resources Manager;
- Assistance with stakeholder engagement and building relationships with local community stakeholders;
- Act as the primary points of contact between communities and the responsible company; and
- Implementation of the social management system including social management plans.

12.2.6 Lead Contractor

- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management;
- Implement mitigation measures outlined in the ESMP and management plans to ensure adherence to the local legal requirements, and relevant international standards;
- Ensure staff members are regularly trained and awareness is built relating to environmental and social management, in particular human rights aspects of security provision; and
- Provide regular feedback to the Sustainability and/or Environment Manager regarding of the project and notify if there are any issues.

12.2.7 Independent Environmental Control Officer (IECO)

- The IECO is responsible for monitoring all activities on a development site and ensuring that all contractors comply with the requirements of the conditions as stipulated in any environmental authorisation as well as the requirements as outlined in the EMPrs (Environmental Management Programme). The IECO would be on the site on a regular basis to assess the project, its aspects and impacts and advise as to the required actions in order to ensure that all legal requirements, best practise protocols, adherence to by-laws etc. are achieved and to attend site meetings;
- The IECO should be able to provide environmental awareness training to all staff on a construction site both in the induction phase as well as ongoing throughout the construction phase;
- The IECO should liaise with the client, environmental manager and the relevant authority throughout the construction and operational phase of the project;
- Assisting the lead contractor in ensuring all the necessary environmental authorizations and permits have been obtained and confirming that all the activities on the project site comply to legal requirements;
- Inspecting the construction site and surrounding areas regularly with regards to addressing issues of concern that may have an impact on the environment;
- Keeping photographic record of progress on the site;
- Maintain the following on site:
  - A daily site register;
  - A non-conformance register (NCR); and
  - A public complaint register.
- Ensuring proactive and effective implementation and management of environmental protection measures;
- Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- IECO would also be responsible for the auditing of the site from an environmental aspect which is usually done on a monthly basis. The results of such an audit are then submitted to the environmental competent authority so that they can monitor compliance in terms of the relevant national legislation. Such an audit would also address aspects such as the recommendation of the issuing of penalties to the lead contractor and responsible company for repeated or serious contraventions e.g. hazardous chemical/oil spills; dumping of foreign material into sensitive environmental areas such as wetlands and grasslands; destruction of or damage to protected vegetation; Damage to cultural sites (temples, graves, buildings etc.; and
- The IECO would also address and ensure that an ethos of progressive rehabilitation takes place throughout the construction phase so as to ensure that the development site is rehabilitated to a high level of environmental integrity that is not only aesthetically pleasing but ecologically functional.

13 Contact details of the responsible company's representative/s

Note: This section presents the contact details of company representative/s that is/are responsible for implementing the plan.

Appendices

Note: This section should include key documents that are relevant to the project e.g. environmental authorisation, environmental management plan including mitigation measures and list of project stakeholders.

Appendix H: Example of Generic Stakeholder Engagement Process

1 Generic stakeholder engagement process for an ESIA

The objectives of stakeholder engagement activities during the various phases of a GIIP compliant ESIA are outlined below.

1.1 During the Screening Phase

During screening, engagement is focused on gaining an understanding of the potential concerns and issues of key stakeholders. It also provides stakeholders with an opportunity to contribute local information and knowledge and to be involved in the design of the stakeholder engagement process.

1.2 During the Scoping Phase

The Scoping Phase of the ESIA focuses on preparing a Scoping Report and detailed Terms of Reference (ToR) for the specialist studies to be conducted during the Impact Assessment phase.

The objectives of stakeholder engagement during scoping are to provide sufficient and accessible information to stakeholders in an objective manner to assist them to:

- Identify issues of concern and provide suggestions for enhanced benefits so as to reflect relevant issues in the ToR for the specialist studies;
- Assist in identifying reasonable alternatives;
- Contribute relevant local information and traditional knowledge to the environmental assessment; and
- Verify that their issues and concerns have been recorded and considered.

In addition, liaison with stakeholders during the ESIA Scoping Phase also serves the following company external relations objectives:

- Maintaining ongoing engagement with stakeholders;
- Providing information on company plans, policies and forthcoming actions;
- Being informed in a neutral setting of concerns relating to company actions, and having the opportunity to respond in a neutrally facilitated situation;
- Building or maintaining understanding and trust, good relations and credibility; and
- Obtaining people's views of their current quality of life and a vision for their future quality of life; and to inform the company's sustainable development and corporate responsibility initiatives.

1.3 During the Impact Assessment Phase

Stakeholder engagement during the Impact Assessment phase of the ESIA will revolve around a review of the findings of the environmental and social specialist studies, and ESIA Report.

The findings will be presented in a draft ESIA Report, a non-technical summary of the draft ESIA Report and an updated version of the Comment and Response Report, in which the responses to stakeholder issues will be updated to reflect the findings of the ESIA.

The objectives of stakeholder engagement during the Impact Assessment phase of the ESIA are to:

- Provide stakeholders with the opportunity to verify that their issues have been considered in the ESIA specialist assessments; and
- Provide stakeholders with the opportunity to comment on the findings of the ESIA specialist studies and recommended management measures to reduce negative impacts and enhance positive ones.

1.4 During the Decision-making Phase

The main aim of this phase is to inform stakeholders of the outcome of the government authority's decision on the ESIA and the way forward for the project.

Table 1 provides a summary of information disclosure and consultation tasks and indicative timeframes during an ESIA process.

Table 1: Summary of key information disclosure and consultation tasks and activities during the various phases of an ESIA process

Information Disclosure and Consultation during an ESIA		
Task	**Activities during Screening Phase**	**Indicative Timelines**
Planning and preparation of engagement documentation	• Compile Background Information Document (BID) and MS PowerPoint presentation describing the project, history of project, ESIA process, and how stakeholders can be involved.	Month 1-3
	• Commence development of a Stakeholder Engagement Plan (SEP) framework.	
Develop stakeholder database	• Identify and categorise stakeholders from a wide range of sectors of society and develop a project stakeholder database. Analyse stakeholders to inform the level, intensity and method of engagement with the various stakeholder groups.	
	• The database is updated throughout the ESIA process.	
Pre-consultation with key stakeholders	• Conduct pre-consultation focus group meeting/s with key stakeholders such as the authorities and traditional leadership.	
	• Record stakeholder comments and issues.	
Compile Stakeholder Engagement Plan (SEP)	• Refine SEP based on stakeholder input during pre-consultation to ensure that the design of the engagement process aligns with the local context and required level of engagement.	
Compile Comment and Response Report (CRR)	• The Comment and Response Report records all issues, comments and suggestions received from stakeholders during meetings and in writing. It forms an important part of the ESIA Report, and is a detailed collation of all stakeholder comments gathered throughout the ESIA process.	
Project announcement and scoping	• Distribute announcement letter, BID and comment sheet (in relevant local language by email and personal delivery to all stakeholders on the database.	Month 3-6
	• Announce the project by way of notifications in the local print media or radio announcements to inform stakeholders about the opportunity to comment on the project within the commenting period (number of days dependant on in-country regulations. Good International Industry Practice (GIIP) usually allows a 30-day commenting period)	
	• Make the BID and comment sheet available in publicly accessible places such as the local library, community centre, school etc.	
	• Post the BID and comment sheet on the company and ESIA consultant's websites for stakeholders who have access.	
	• Convene information sharing meetings in main local language (with translations into other local languages as necessary) to present the project to stakeholders (affected	

Information Disclosure and Consultation during an ESIA		
Task	**Activities during Screening Phase**	**Indicative Timelines**
	communities, relevant government departments, other affected parties) and provide them with an opportunity to comment	
	• Conduct dry run meeting with project team members prior to the information sharing meetings. The purpose of the dry run meeting is for the team to finalise meeting arrangements and presentations to ensure that messages are clear and consistent, and to strategise on responses to stakeholder comments and questions.	
	Update Comment and Response Report (CRR) with stakeholder comments and responses from project proponent and the ESIA project team.	
	Prepare Stakeholder Engagement Chapter which documents the stakeholder engagement process followed during the Scoping Phase, for incorporation into the Draft ESIA Report.	
Feedback on scoping	Public comment on the Draft Scoping Report. The draft report will to be available in public places and meetings can be held to discuss the results of these reports. Public comment on the Draft Scoping Report will be included in Final Scoping Report for submission to the authorities.	Months 6-7
Commenting period for draft findings of ESIA and Non-Technical Summary	Distribute notification letters informing stakeholders of the opportunity to comment, where to find the reports and inviting them to feedback meetings where the draft findings of the ESIA will be presented. Stakeholders will have access to the full ESIA Report and the non-technical summary in relevant local languages to comment on during the commenting period (generally 30 days).	Months 12-13 (this engagement can only commence after the specialist investigations have been completed and ESIA drafted)
	Post report and non-technical summary together with comment sheets on the project proponent and ESIA consultant's websites, and in public places. After the comment period, additional comments received can be added as an addendum.	
Feedback meetings	Convene public meetings and/or focus group meetings with affected communities, relevant government departments, and other affected parties to provide feedback on the findings of the ESIA, for their comment and discussion. The feedback will focus on the key negative and positive impacts of the proposed project, and the recommended management measures.	Months 12-13 (meetings will be undertaken during the comment period)
	A dry run meeting as described above will be held prior to the feedback meetings.	
Update stakeholder engagement documents for final ESIA report	After the end of the commenting period, update CRR with stakeholder comments and responses from project proponent and the ESIA project team.	Month 14
	Update Stakeholder Engagement Chapter for Final ESIA Report to document feedback meetings and the engagement process during the impact assessment.	
Notify stakeholders of authorities' decision and appeal process (where relevant)	Send letter to stakeholders to notify them of the authorities' decision on the proposed project, thanking them for their contributions and explaining the way forward for the project. If the country has an appeal process, inform the stakeholder of the appeal timeframe.	Month 17 (following the comment period of the authority)

Appendix I: Generic ESMP Monitoring and Evaluation Checklist

Generic ESMP Monitoring and Evaluation Checklist

Note: The information contained in this table is generic and only provides a selection of possible environmental and social commitments that may be contained in an ESMP. The checklist should be adjusted to reflect the actual commitments contained in an approved ESMP for a specific energy project.

Ref.	Commitment	Compliance	Non-compliance	Not applicable	Evidence	Action Required
Environmental Social Management Plan Commitments						
1. CONTACTORS' CAMP						
1.1	Contractors camp must be defined and fenced off within this area					
1.2	The camp area is to be maintained in a neat and orderly state at all times					
1.3	Provision must be made for adequate and sufficient toilet facilities which must be secured and should be placed at convenient locations around the contractors' camp					
1.4	The contactor camp must make use of dust suppression mechanisms					
1.5	Temporary structures must be properly decommissioned					
1.6	Contactor must provide suitable areas for maintenance, mixing of concrete etc.					
1.7	Contactor must provide shaded areas with sufficient drinking water available					
1.8	Contractor must ensure that all legal documents (Environmental social management plan, environmental authorization and all other relevant approvals) is available at all times					
2. MANAGEMENT OF CONSTRUCTION ACTIVITIES AND WORKFORCE						
2.1	Ensure that construction activities be limited to weekdays (Monday – Friday) during working hours (8am – 5pm)					
2.2	Ensure that soils are stockpiled separately					
2.3	Ensure that all vehicles and machinery are maintained and are in good working order					
2.4	Ensure that vehicle maintenance does not result in environmental contamination					
2.5	Areas must have a sump					
2.6	Drip trays must be made available for all generators, pumps compressors etc.					
2.7	All vehicle and machinery service areas must be underlain by an impermeable surface, be bunded and slope towards sump					
2.8	Avoid contamination of the soil by spilt cement, hydraulic fluids, oil, diesel etc.					

Ref.	Commitment	Compliance	Non-compliance	Not applicable	Evidence	Action Required
Environmental Social Management Plan Commitments						
2.9	Maintain a record of disposal certificates, as this may be requested by the authorities					
3. POLLUTION CONTROL						
3.1	Storage and handling of fuels, lubricants, chemicals etc. must be in an impervious, bunded area					
3.2	The contractor must compile an inventory of all fuels and hazardous substances to be used and stored on the site, and must ensure that they know the effects of these substances on their staff and the environment					
3.3	Hazardous materials must be suitable stored in a secure, restricted entry area					
3.4	Relevant material safety data sheets information is to be kept on file and displayed at the relevant storage area					
3.5	Hazardous materials storage area must display the required safety signs depicting no smoking, no naked lights and danger, the container must be clearly marked to indicate contents as well as safety requirements					
3.6	These chemicals must be stored in a designated bunded area and with an impermeable base, preferable sheltered					
3.7	Ensure that sufficient spill kits and spares are available in the case of a spill					
4. WASTE MANAGEMENT						
4.1	Ensure that all waste is separated into general and hazardous waste bins					
4.2	Ensure that all waste bins are clearly labeled					
4.3	Ensure that hazardous waste is bunded					
4.4	Ensure that when waste facilities are scavenger proof and are covered					
4.5	Burning of waste must not be allowed on site, all waste must be stored and disposed of at a registered landfill site					
5. WATER MANAGEMENT						
5.1	Prevent storm water run-off from contacting wastes or contaminants on the site					
5.2	Ensure that grid traps are in place to trap litter and detritus before storm water is released					
5.3	Divert clean/storm water around the laydown area and actively worked on area using defined drainage corridors protected by erosion					
5.4	Ensure that no construction material or any waste material is dumped into any watercourse or surrounding area					
6. GENERAL						
6.1	Provide a comprehensive first aid kit. Make sure that there are staff members who are trained to use it					

SAPP ESMF Appendix I – EMP Monitoring and Evaluation Checklist

Ref.	Commitment	Compliance	Non-compliance	Not applicable	Evidence	Action Required
Environmental Social Management Plan Commitments						
6.2	Provide sufficient fire-fighting equipment on site and make sure that there are staff members who know how to use it					
6.3	Ensure that all employees wear the appropriate Personal Protection Equipment (PPE)					
6.4	Ensure that the contractor provide environmental awareness training to employees and that environmental awareness posters are displayed on site					
6.5	Ensure that an approved Emergency response plan is clearly displayed					
6.6	Contractor must be in possession of an incident register					
6.7	Contractor must be in possession of a complaints register					

Appendix J: Impacts, Risks and Mitigation Measures

Table 1: Table of risks, receptors, causes, and high-level mitigation/management measure per energy project type

Project type	Receptor	Risks	Causes	Potential high-level mitigation/management measures
Climate change				
All generation & transmission	**Energy facility**	Damage to infrastructure or disruption of construction or operations.	Increased frequency or severity of weather events.	Undertake climate change vulnerability assessment and implement necessary mitigation measures.
Hydropower	**Communities**	Reduced electricity generation capability of facility.	Increases in the severity and frequency of droughts would reduce the capacity for hydropower generation. Increased severity and frequency of floods could threaten reservoir safety.	Undertake course-vulnerability assessment and plan facility accordingly.
		Reduced safety of facility.	Increased severity and frequency of floods could threaten reservoir safety.	Design dam wall taking climate change included frequency of flooding into account.
		Community health and safety.	Increased severity and frequency of floods could threaten the safety and livelihoods of downstream communities due to dam needing to release more water downstream than planned design.	Design re-settlement requirements to take increased frequency and severity of flooding into account. Development, implement and regularly check effectiveness of early warning systems.
Nuclear	**Terrestrial, aquatic & marine biodiversity**	Ecosystem health impacts and potential mortalities	Fall-out from major plant malfunction.	Regular maintenance, back-up systems, and ongoing training and retention of key technical staff
Occupational & public health, safety & security				
Nuclear	**Communities**	Workforce and public health risk.	Fall-out from major plant malfunction.	Regular maintenance, back-up systems, and ongoing training and retention of key technical staff.
Socio-economic				
All generation & transmission	**Communities**	Social disruption due to influx of people.	The relatively sudden influx of construction workers and opportunist migrants will have an effect on the resident communities.	Undertake socio-economic impact assessment including: consultation with stakeholders; determination of optimisation, mitigation, compensation and potential alternative likelihood and resettlement options; implement management measures. Reduce labour influx by tapping into the local workforce; assess and manage labour influx risk based on appropriate instruments, including site-specific Labour Influx Management Plan and/or Worker's Camp Management Plan; and incorporate mitigation measures into the civil works contract, including worker's code of conduct and training and awareness raising program for workers and local community.
			The incomers may have different cultures, and may disrupt social networks in the area, resulting from, and further contributing to, increase in crime and prostitution, and social tension between the locals and outsiders.	
			This in-migration will also place pressure on the social infrastructure in the area.	
		Reduction in community health.	In-migration of people carrying communicable diseases.	
		The influx of workers and migrants may bring improved livelihoods opportunities for the local population.	In-migration and out-migration of workers.	
		Risk of local price inflation.		
		Depression of the local economy at the time of out-migration of workers once construction has completed.		
Infrastructure				
All generation & transmission	**Energy facility**	Damage to infrastructure.	Earthquake.	Undertake risk assessment and design infrastructure to mitigate and manage risk to acceptable levels.
Institutional				
All generation & transmission	**All aspects**	Inadequate mitigation and management of impacts	Lack of human and financial resources or environmental and social management system to adequately implement necessary mitigation and/or management measures.	Planning and acquisition of necessary human and financial resources and development and implementation of sound environmental and social management system.

Table 2: Table of impacts, receptors, causes, and high-level mitigation/management measure per energy project type

Project type	Receptor	Impacts	Causes	Potential high-level mitigation/management measures
Climate change				
Solar & wind	**Communities**	Reduction in country contribution to Greenhouse Gas emissions.	Utilisation of renewable energy source.	Optimise renewable energy generation in host country.
Hydropower		Contribute to global warming & climate change.	Increased emission of greenhouse gases from the reservoir caused by rotting of vegetation and carbon inflows from the catchment after flooding.	Select sites with deeper valleys, to avoid vast flood area.
Thermal & Geothermal		Contribute to global warming & climate change, including impacts on national policy and treaty obligations.	Substantial emissions of greenhouse gasses.	Implement best practice technologies, utilities high grade fuel sources, reduce energy generation from non-renewable sources.
Biodiversity				
All generation & transmission	***Terrestrial biodiversity***	Permanent loss of terrestrial habitats.	Site clearing leading to loss or fragmentation of terrestrial habitats, including altering the floral and faunal species composition and possibly rendering the fragmented ecosystems unable to support the species assemblages found in undisturbed ecosystems.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement rehabilitation or restoration. Design and implement biodiversity offset if appropriate.
		Loss of terrestrial species.	Site clearing leading to loss of habitats.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement rehabilitation or restoration. Design and implement biodiversity offset if appropriate.
			Increase in natural resource-dependent livelihoods, including charcoal- and firewood-making, bush meat production etc.	Develop natural-resource management plan in partnership with communities. Explore options for alternatives to natural resource use or increased sustainability options.
		Fragmentation of ecological and migratory corridors.	Site clearing and habitat degradation.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement rehabilitation or restoration. Design and implement biodiversity offset.
		Loss of ecosystem goods and services.	Site clearing leading to loss or fragmentation of terrestrial habitats/species and associated goods and services ecosystems.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement rehabilitation or restoration. Design and implement biodiversity offset if appropriate. Identify options for provision of alternative options to compensate for loss of goods and services.
			Increase in natural resource-dependent livelihoods, including charcoal- and firewood-making, bush meat production etc.	Develop natural-resource management plan in partnership with communities. Explore options for alternatives to natural resource use or increased sustainability options.
		Loss or impact on protected areas.	Siting of projects within or in proximity to protected areas (e.g. National or Provincial Parks, Local Authority or Private Natures Reserve, RAMSAR sites etc.).	Avoid national parks or associated buffer zones.
	***Aquatic* biodiversity**	Permanent loss of terrestrial habitats.	Site clearing leading to loss or fragmentation of aquatic habitats, including altering the floral and faunal species composition and possibly rendering the fragmented ecosystems unable to support the species assemblages found in undisturbed ecosystems.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility).
		Loss of terrestrial species.	Reduction in water quantity or quality due to abstraction or pollution.	Design, implement and maintain good practice storm and waste water management systems.
			Site clearing resulting in loss of habitats.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility).
			Increase in natural resource-dependent livelihoods, including charcoal- and firewood-making, bush meat production etc.	Develop natural-resource management plan in partnership with communities. Explore options for alternatives to natural resource use or increased sustainability options.
		Loss of ecosystem goods and services.	Site clearing leading to loss or fragmentation of terrestrial habitats/species and associated goods and services ecosystems.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility).
			Increase in natural resource-dependent livelihoods, including charcoal- and firewood-making, bush meat production etc.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Design and implement search and rescue operations for relevant species. Implement rehabilitation or restoration. Design and implement biodiversity offset if appropriate.

Project type	Receptor	Impacts	Causes	Potential high-level mitigation/management measures
		Loss or impact on protected areas.	Siting of projects within or in proximity to protected areas (e.g. National or Provincial Parks, Local Authority or Private Natures Reserve, RAMSAR sites etc.).	Develop natural-resource management plan in partnership with communities. Explore options for alternatives to natural resource use or increased sustainability options.
	***Marine* biodiversity**	Loss or impact on marine protected areas.	Siting of projects within or in proximity to marine protected areas.	Avoid national parks or associated buffer zones.
Hydropower	***Terrestrial* biodiversity**	Increased competition for resources.	The creation of islands within the reservoir will result in an increase in inter- and intra-specific competition for limited resources on the islands, ultimately resulting in mortality for less adaptable or less competitive species, and those requiring larger home ranges.	Relocation key species from islands. Evaluate site options to avoid island creation where possible.
		Changes in species composition and habitats.	Raising of the water table in reservoir. Temporary reduction/cessation of downstream water flow during filling of reservoir. Reduction in downstream flow due to controlled releases during operation.	Select sites with deeper valleys, to minimise area that will be flooded.
		Mortality of fauna by drowning.	Inundation of the reservoir may result in drowning of ground-dwelling animals unable to move higher ground as the water level rises.	Select sites with deeper valleys, to minimise area that will be flooded. Implement search and rescue operation for relevant species.
		Shift in the terrestrial wildlife species assemblage from riparian to lacustrine.	The reservoir will reduce habitats for species requiring flowing water (including insectivorous birds and bats) but will increase foraging habitat for species preferring still or slow-moving waters (including water birds).	Select sites with deeper valleys, to minimise area that will be flooded.
			New habitats will be provided by presence of the reservoir and the increase in the year-round availability of water.	Select sites with deeper valleys, to minimise area that will be flooded.
		Natural processes disturbed and associate habitat changes.	Flow in the existing river captured in reservoir/s and released at a controlled rate for a steady generation of hydropower.	Select sites with deeper valleys, to minimise area that will be flooded. Mimic natural flow and flood regimes whenever possible via well-timed controlled releases.
	***Aquatic* biodiversity**	Biological communities in the reservoir will begin to acquire lacustrine characteristics.	Decline of species (particularly mayflies and certain fish) that prefer moving water and coarse substrate.	Select sites with deeper valleys, to minimise area that will be flooded. Mimic natural flow and flood regimes whenever possible via well-timed controlled releases.
			Increased shallow water littoral zone, resulting in proliferation of aquatic vegetation that could provide a favoured habitat of disease vectors.	Select sites with deeper valleys, to minimise area that will be flooded. Mimic natural flow and flood regimes whenever possible via well-timed controlled releases.
		Species mortality or reduced reproductive rates.	Construction activities increased suspended and dissolved solids, covering coarse substrate essential for spawning, filling shallow-water refuges for small fish or smothering aquatic vegetation.	Implement good practice construction methods and housekeeping and avoid aquatic habitats to the greatest extent possible.
			Construction activities increased suspended and dissolved solids, increasing turbidity causing damage fish gills and leading to fish mortality.	Implement good practice construction methods and housekeeping and avoid aquatic habitats to the greatest extent possible.
		Changes to composition and diversity of aquatic vegetation.	Raising of the water table in reservoir. Temporary reduction/cessation of downstream water flow during filling of reservoir. Reduction in downstream flow due to controlled releases during operation.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
		Natural processes disturbed.	Raising of the water table in reservoir. Temporary reduction/cessation of downstream water flow during filling of reservoir. Reduction in downstream flow due to controlled releases during operation.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
Transmission	***Terrestrial* biodiversity**	Bird species mortalities.	Power line strikes.	Implement bird strike avoidance technologies and undertake ongoing research to improve technologies.
Wind	***Terrestrial* biodiversity**	Loss of bat and bird species.	Turbine strikes and changes in air pressure.	Implement bird and bat strike management measures (e.g. manage operational times) and latest technologies to minimise strikes.
			Electromagnetic interference with radar of bats.	Implement bird and bat strike management measures (e.g. manage operational times) and latest technologies to minimise strikes.
Nuclear	***Terrestrial, aquatic & marine biodiversity***	Ecosystem health impacts and potential mortalities.	Exposure to inappropriately stored nuclear waste.	Handle, storage and manage nuclear waste based on best practice approaches.
		Ecosystem health impacts and potential mortalities	Fall-out from major plant malfunction.	Regular maintenance, back-up systems, and ongoing training and retention of key technical staff
	Marine biodiversity	Loss of spawning grounds for marine organisms.	Offshore dumping of spoil during construction phase.	Minimise offshore dumping of spoil via alternative disposal methods. Undertake research and evaluate impacts of various disposal options and sites.
Thermal, geothermal & nuclear	***Aquatic and marine* biodiversity**	Changes in species composition and habitats.	Release of heated water from cooling process.	Evaluate options for cooling water effluent disposal, including technologies, sites, length and depth of pipe/s etc.

Project type	Receptor	Impacts	Causes	Potential high-level mitigation/management measures
Archaeology				
All generation & transmission	**Archaeological, palaeontological and cultural features & communities**	Loss of archaeological and palaeontological features.	The destruction of archaeological and palaeontological sites, features and material remains due to land take.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement relocation of key features where appropriate.
		Loss of cultural heritage.	The destruction of cultural and spiritual sites, features, material remains, and local culture due to land take.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement relocation of key features where appropriate.
Ground water				
All generation & transmission	**Water resources & communities**	Reduction in volume of available water resource.	Over-abstraction.	Evaluate long-term sustainable yield of resource and only abstract within these parameters.
		Loss or reduction in quality of water resource.	Pollution of resource from hydrocarbons, metals, effluent etc. during construction, operation or decommissioning.	Design and implement pollution prevention methods, including for surface and ground water.
Geothermal		Loss or reduction in quality of water resource.	Contamination from water pumped underground (e.g. sulphur, salts and other minerals).	Evaluate water quality to inform pumping of water.
Thermal		Loss or reduction in quality of water resource.	Poor management of fly and bottom ash and coal slurry.	Evaluate, design and implement good practice storage and disposal methods, including pollution prevention.
Hydropower		Raising of the water table.	Waterlogging of soils, soil salinization, iron-pan formation in low-lying areas, and changes to the quantity and quality of water supplied by community boreholes.	Evaluate impacts on community boreholes and implement alternative water supply options if required (e.g. deeper boreholes, water supply via alternative sources).
			The use of water for construction is likely to affect the quantity of groundwater available for local communities.	Evaluate potential impacts on current community water sources, evaluate and implement alternative sources for construction or the communities, after thorough consultation with community stakeholders.
Surface water				
All generation & transmission	**Water resources & communities**	Reduction in water quality.	Construction: Due to pollution as a result of spillage of fuels, lubricants and other toxic materials at the construction site, discharge of silt laden run off from sites, and the inadequate treatment and disposal of waste and wastewater from worker facilities.	Implement good practice construction methods and housekeeping, and avoid or minimise run-off from construction areas into water bodies via bunding, berms etc.
			Operation: Due to pollution as a result of spillage of fuels, lubricants and other toxic materials at the construction site, and the inadequate treatment and disposal of waste and wastewater from worker facilities.	Implement good practice construction methods and housekeeping.
			Operation: Ongoing use of vehicles, fuels and chemicals at project facilities and in the vicinity of the reservoir.	Implement good practice construction methods and housekeeping.
		Reduction in natural water levels.	Abstraction from surface water for construction or operational activities.	Evaluate potential impacts on current water users, evaluate and implement alternative sources for construction, operation or current water users.
Thermal		Loss or reduction in quality of water resource.	Poor management of fly and bottom ash and coal slurry.	Evaluate potential impacts on natural bodies, evaluate and implement alternative sources for construction or appropriate mitigation measures.
Hydropower		Reduction in natural water levels.	Temporary interception of water flow during construction.	Evaluate options for ongoing releases to downstream areas during construction phase.
			Flow in the existing river captured in reservoir/s and released at a controlled rate for a steady generation of hydropower. Downstream river flows evened out, with reduced floods and increased base flows.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
		Temporary interception of water flow during filling.	The existing flow will be intercepted resulting in impacts on ecosystems and livelihoods in the river downstream of the reservoir.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
		Differences in riverine conditions in the new reservoir compared with the existing lake/river.	Vegetation decomposition, algal and weed growth, reduced gas exchange resulting from reduced turbulence in the river, and increased temperatures in the reservoir may result in reduced dissolved oxygen levels in the water, impairing reservoir water quality in the short term and leading to long term dissolved oxygen levels being lower than those in the existing river.	Assess dam design options to minimise impacts on up- and downstream water resources. Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
		Differences in riverine conditions downstream of dam wall.	Flow in the existing river captured in reservoir/s and released at a controlled rate for a steady generation of hydropower, downstream river flows evened out, with reduced floods and increased base flows, included altered sediment conditions.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.

SAPP ESMF Appendix J – Impacts, Risks and Mitigation Measures

Project type	Receptor	Impacts	Causes	Potential high-level mitigation/management measures
Land use, land capability, soils & agriculture				
All generation & transmission	**Communities**	Permanent land-take/loss.	As a result of site clearing and construction of infrastructure.	Limit size and configuration of site via avoidance and minimisation options analysis during initial project planning (concept/pre-feasibility). Implement rehabilitation or restoration. Design and implement offsets if appropriate.
		Loss of land uses.	As a result of site clearing and construction of infrastructure.	Identify and implement compensation options.
		Soil contamination and associated loss of productive land.	Contamination of soils as a result of improper handling of oils and lubricants.	Implement good practice construction methods and housekeeping.
		Soil erosion and loss.	Excavation work and removal of vegetation cover during construction with insufficient soil conservation/protection measures.	Implement good practice construction methods, including rehabilitation.
Geothermal		Land subsidence.	Abstraction of groundwater from reservoir.	Evaluate risk and implement pumping of water back into groundwater reservoir.
		Increased frequency and severity of small-scale earthquakes.	Extraction of ground water for generation process.	Evaluate risk and implement pumping of water back into groundwater reservoir.
Hydropower		Loss of land uses.	Construction of reservoirs, saddle dams, powerhouse, switchyard, roads, transmission lines. Uses affected could include domestic, business and community facilities (i.e. shops, schools, healthcare centres, recreation areas etc.) as well as farming, fishing, forest resource use areas and hunting grounds.	Identify and implement compensation options, including development of new facilities at sites agreed with communities following thorough consultation process.
		Reduced ability to undertake agriculture.	Reduction or cessation of replenishment of nutrients from silt-laden floodwaters.	Mimic natural flood and flow regimes whenever possible via well-timed controlled releases.
		Loss of land uses.	Resettlement of communities will result in land-take in areas away from the project site.	Evaluate options to achieve sustainable resettlement whilst minimising loss of new areas of land for key uses.
Occupational & public health, safety & security				
All generation & transmission	**Workforce & communities**	Reduction in health of workforce and public.	Air pollution caused by exhaust fumes and burning of waste.	Develop, implement, monitor and update Waste and Emissions Plans. Implement industry good practice regarding vehicle maintenance and waste management.
			Dust generation caused by increased traffic on unpaved roads and transportation of fine construction materials on open vehicles.	Assessment dust impacts and implement dust suppression methods, possibly including paving key roads.
			Dust generation from construction materials due to wind conditions.	Implement good practice housekeeping, including dust suppression.
			Air pollution caused by emissions during operations.	Apply best practice technologies, including potential refurbishments.
Thermal		Reduction in health of workforce and public.	Emissions, including So_2, NO_x, PM_{10} & $PM_{2.5}$ and exposure to water contaminated by emissions.	Apply best practice technologies, including potential refurbishments.
Solar		Workforce health risk.	Exposure to hazardous materials in damaged thin-film PV panels.	Appropriate recycling or disposal at licensed hazardous waste facility.
Nuclear		Workforce and public health risk.	Exposure to inappropriately stored nuclear waste.	Appropriate handling and storage.
Wind		Reduction in quality of life.	Vibration, shadow flicker and noise from turbines.	Plan turbines as far from urban settlements as practically possible. Apply best practice technologies, including potential refurbishments.
All generation		Increased road accidents and associated injuries or mortalities.	Increase in road traffic due to workforce or transportation of products, particularly raw materials (e.g. coal).	Assess traffic impacts and implement necessary mitigation measures.
Socio-economic				
All generation & transmission		Loss or disruption of livelihoods and immovable assets including land, standing crops and trees for households.	Total loss of livelihoods and immovable assets including the loss of land, standing crops and trees for households.	Undertake socio-economic impact assessment including: consultation with stakeholders; determination of optimisation, mitigation, compensation and potential alternative likelihood and resettlement options; implement management measures.
		Physical isolation of communities from larger villages caused by construction of reservoir.	Restricted access to agricultural land caused by construction of reservoir, saddle dams, powerhouses, roads etc.	
		Improvement in local economy.	Greater flows of capital in the area via construction activities, included employment and influx of job seekers.	
		Improvement in local and regional infrastructure and facilities.	Investment of financial by government or project proponent in local and/or regional infrastructure.	
		Improvement in community health.	Investment by government or project proponent in local health facilities.	
		Reduction in community health.	Loss of medicinal plants.	

Project type	Receptor	Impacts	Causes	Potential high-level mitigation/management measures
			Reduced food security arising from lower farm productivity.	
			During construction, health risks may include respiratory diseases, eye infections, hearing impairment, and increased traffic.	
			Job opportunities may be provided for skilled and unskilled labourers during the construction phase.	
		Increased or decreased employment opportunities.	In-migration and out-migration of workers.	
		Reduced livelihood opportunities due to reduced agricultural capability of land.	Temporary reduction/cessation of downstream water flow during filling of reservoir. Flow in the existing river captured in reservoir/s and released at a controlled rate for a steady generation of hydropower, resulting in a reduction in regular replenishment of nutrients from silt-laden floodwaters.	
Hydropower		Reduced livelihood and/or income generation capabilities via agriculture.	The reservoir may improve livelihoods through an increase in fishery productivity and fishing incomes.	
		Improved livelihoods.	Positive impact of tourism on the local economy.	
		Improved livelihoods. Increase in communicable diseases.	A permanent change in water flows in the river and the creation of the reservoir will increase the presence of communicable diseases such as bilharzia, trypanosomiasis, guinea and intestinal worms, and onchocerciasis.	
			Reduced availability and/or quality of drinking water around and downstream of the reservoir, particularly in water-scarce areas.	
		Decline in drinking water quality.	Offshore dumping of spoil during construction phase, causing loss of spawning grounds for marine organisms and affecting fishing industry.	Undertake health impact assessment and implement necessary mitigation measures.
		Loss of goods and services, including revenue from fisheries.	Offshore dumping of spoil during construction phase, causing loss of spawning grounds for marine organisms and affecting fishing industry.	Undertake assessment of risks to community water sources and implement mitigation and management measures.
Nuclear			Site clearing, construction and operation of infrastructure, increase in light pollution.	Minimise offshore dumping of spoil via alternative disposal methods. Undertake research and evaluate impacts of various disposal options and sites.
Visual				
All generation & transmission			Earthquake.	Plan turbines as far from key landscape features and urban settlements as practically possible. Apply best practice technologies, including options for screening and reduced visibility and light pollution.
Infrastructure				
All generation & transmission	**Energy facility**			Undertake risk assessment and design infrastructure to mitigate and manage risk to acceptable levels.

Appendix K: Generic Impact Rating Methodology

Note: The impact assessment methodology presented in tables 1-3 serve as a generic guideline only. SAPP member utilities will need to follow the assessment methodologies outlined in EIA regulations or guidelines set by national regulators. A high-level methodology for cumulative impact assessment is presented for reference purposes.

Environmental and social impact assessment methodology

Table 1: Key elements in the evaluation of impact significance

Element	Description	Questions applied to the test of significance
Consequence	An impact or effect can be described as the change in an environmental parameter, which results from a particular project activity or intervention. Here, the term “consequence” refers to: (a) The sensitivity of the receiving environment, including its capacity to accommodate the kinds of changes the project may bring about. (b) The type of change and the key characteristics of the change (these are magnitude, extent and duration). (c) The importance of the change (the level of public concern/ value attached to environment by the stakeholders and the change effected by the project). The following should be considered in the determination of impact consequence: (a) Standards and guidelines (thresholds). (b) Scientific evidence and professional judgment. (c) Points of reference from comparable cases. (d) Levels of stakeholder concern.	Will there be a change in the biophysical and/or social environment? Is the change of consequence (of any importance)?
Probability	Likelihood/chances of an impact occurring.	What is the likelihood of the change occurring?
Effectiveness of the management measures	Significance of the impact needs to be determined both without management measures and with management measures. The significance of the unmanaged impact needs to be determined so there is an appreciation of what could occur in the absence of management measures and of the effectiveness of the proposed management measures.	Will the management measures reduce impact to an acceptable level?
Uncertainty/ Confidence	Uncertainty in impact prediction and the effectiveness of the proposed management measures. Sources of uncertainty in impact prediction include: (a) Scientific uncertainty – limited understanding of an ecosystem (or affected stakeholders) and the processes that govern change. (b) Data uncertainty – restrictions introduced by incomplete, contradictory or incomparable information, or by insufficient measurement techniques. (c) Policy uncertainty – unclear or disputed objectives, standards or guidelines. There are a number of approaches that can be used to address uncertainty in impact prediction, including: (a) ‘Best’ and ‘worst’ case prediction to illustrate the spread of uncertainty. (b) Attaching confidence limits to impact predictions. (c) Sensitivity analysis to determine the effect of small changes in impact magnitude.	What is the degree of confidence in the significance ascribed to the impact?

Table 2: Impact assessment methodology characteristics

Characteristics used to describe consequence	Sub-components	Terms used to describe the characteristic
Type		Biophysical, social or economic
Nature		Direct or indirect, cumulative etc.
Status		Positive (a benefit), negative (a cost) or neutral
Phase of project		During pre-construction (if applicable e.g. resettlement), construction, operation, decommissioning/post closure
Timing		Immediate, delayed
Magnitude	**Sensitivity** of the receiving environment/ receptors	High, medium or low sensitivity Low capacity to accommodate the change (impact)/ tolerant of the proposed change
	Severity/ intensity (degree of change measured against thresholds and/or professional judgment)	Gravity/ seriousness of the impact Intensity/ influence/ power/ strength
	Level of stakeholder concern	High, medium or low levels of concern All or some stakeholders are concerned about the change
Spatial extent or population affected The area/population affected by the impact The boundaries at local and regional extents will be different for biophysical and social impacts.		Area/ volume covered, distribution, population Site/Local (social impacts should distinguish between site and local), regional, national or international
Duration (and reversibility) Length of time over which an impact occurs and potential for recovery of the endpoint from the impact		Short term, long term Intermittent, continuous Reversible/ irreversibility Temporary, permanent
Confidence Based on information available and competencies of the assessor		High, Medium, Low

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical environmental and social impacts requiring consideration in the management and approval process; secondly, it serves to show the primary impact characteristics, as defined above, used to evaluate impact significance. An example of an impact significance rating system is presented in Table 3.

Table 3: An example of an impact assessment significance rating system

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE

Use these definitions to define the consequence in Part B

Impact characteristics	Definition	Criteria
MAGNITUDE	Major -	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate -	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor -	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor+	Minor improvement; change not measurable; or threshold never exceeded
	Moderate+	Moderate improvement; within or better than the threshold; or no observed reaction
	Major+	Substantial improvement; within or better than the threshold; or favourable publicity
SPATIAL SCALE OR POPULATION	Site or local	Site specific or confined to the immediate project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
DURATION	Short term	Up to 12 months.
	Medium term	12 months to 5 years
	Long term	Longer than 5 years

PART B: DETERMINING CONSEQUENCE RATING

Rate consequence based on definition of magnitude, spatial extent and duration

			SPATIAL SCALE/ POPULATION		
			Site or Local	**Regional**	**National/ international**
MAGNITUDE					
Minor	**DURATION**	**Long term**	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	**DURATION**	**Long term**	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	**DURATION**	**Long term**	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High

PART C: DETERMINING SIGNIFICANCE RATING

Rate significance based on consequence and probability

		CONSEQUENCE		
		Low	**Medium**	**High**
PROBABILITY (of exposure to impacts)	**Definite**	Medium	Medium	High
	Possible	Low	Medium	High
	Unlikely	Low	Low	Medium

PART D: CONFIDENCE LEVEL

High	Medium	Low

Practical management measures and recommendations and post management significance must be listed, using a GIIP management hierarchy in that:

"Recommendations for management should focus on avoidance, and if avoidance is not possible, then to reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design."

The significance of impacts must then be re-assessed with assumed management measures in place ("after management"). Specialists must recommend and describe appropriate monitoring and review programs to track the efficacy of management measures. These should then be included as Action Plans.

An example of a table report on the significance rating for each impact before and after the implementation of mitigation / management measures, and listing these measures, is presented in Table 4.

Table 4: An example of impact significance rating and mitigation measures for an impact

Impact xx: ………								
	Magnitude	**Duration**	**Scale**	**Consequence**	**Probability**	**Significance**	**+ /-**	**Confidence**
Before Management	*Moderate*	*Long term*	*Site / local*	***Medium***	***Possible***	***Medium***	-	*Medium*
Management Measures: • •								
After Management	*Minor*	*Short term*	*Site / local*	***Low***	***Unlikely***	***Low***	-	*Medium*

Cumulative impact assessment (CIA) methodology

A cumulative impact is defined by the World Bank (2016) as follows: The cumulative impact of the project is the incremental impact of the project when added to impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the project that may occur later or at a different location. Cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time. The environmental and social assessment will consider cumulative impacts that are recognized as important on the basis of scientific concerns and/or reflect the concerns of project-affected parties. The potential cumulative impacts will be determined as early as possible, ideally as part of project scoping.

The IFC (2013) defines CIA in its Good Practice Handbook as a process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen value environmental and social components (VECs) over time, and (b) proposing tangible measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. The key task is to ascertain how the potential impacts of a proposed development might combine, cumulatively, with the potential impacts of the other human activities and other natural stressors such as droughts or extreme climatic events. These factors need to be analysed in relation to a number of VECs. The CIA needs to take cognisance of ongoing influences on the environment in the future that are likely to interact with the VECs.

The CIA process will employ information from a variety of sources, notably the project ESIA, ESIAs for other projects in the area and SEAs where these exist, to identify VECs. Available regional and local environmental, social and resource studies, programmes and/ or planning documents should also be reviewed. The six-step process for a Rapid CIA (Figure 1-1) outlined in the IFC Good Practice Handbook (Appendix B), is presented below:

1. *Scoping Phase - VECs, Spatial and Temporal Boundaries*. This phase is critical as it establishes the spatial and temporal scope of the analysis of cumulative impacts. These aspects should be determined during ESIA linked consultation with project affected communities and other relevant interested parties such as government. VECs should be prioritised based on the level of risk from the development. It is likely that a number of VECs will extend beyond the direct area of influence of a project.
2. *Scoping Phase II - Other Activities and Environmental Drivers.* Once having defined the VECs being affected by the proposed project, the totality of stressors that determine the condition of selected VECs will be identified. This process involves the identification of other sources of stress - past, existing or planned activities - within the analytical boundaries. The potential presence of natural and social external influences and stressors such as wildfires, floods, human migration and new settlements should also be considered. Where appropriate, development scenarios should be used to predict the likely future project activities.
3. *Establish information on baseline status of VECs*. This step is used to define the existing condition of a VEC, understanding its potential reaction to stress, its resilience and recovery time, and assess trends. Trends in environmental and social change can be determined using long-term monitoring of baseline environmental and social conditions. The data being collected as part of the ESIA process provides an analysis of the baseline status of certain VECs within close project proximity. Additional information for CIA indicators will need to be collected over time as the project develops.
4. *Assess Cumulative Impacts on VECs.* After having defined the current status of selected VECs, the potential environmental and social impacts and risks that could affect their long-term sustainability or viability should be identified. The potential additive, cause-effect relationships, and/or synergistic effects of these impacts and risks need to be considered in the assessment.
5. *Assess Significance of Predicted Cumulative Impacts*. It is necessary to define appropriate "thresholds" and indicators and determine the magnitude and significance of the predicted cumulative impact in the context of past, present and future actions.
6. *Management of Cumulative Impacts - Design and Implementation.* Using the mitigation hierarchy (i.e. avoid, minimise, mitigate), management strategies will be designed to address significant cumulative impacts on selected VECs. The management measures needed to prevent cumulative impacts will depend on both the context in which project impacts occur and the characteristics of the projects impacts.

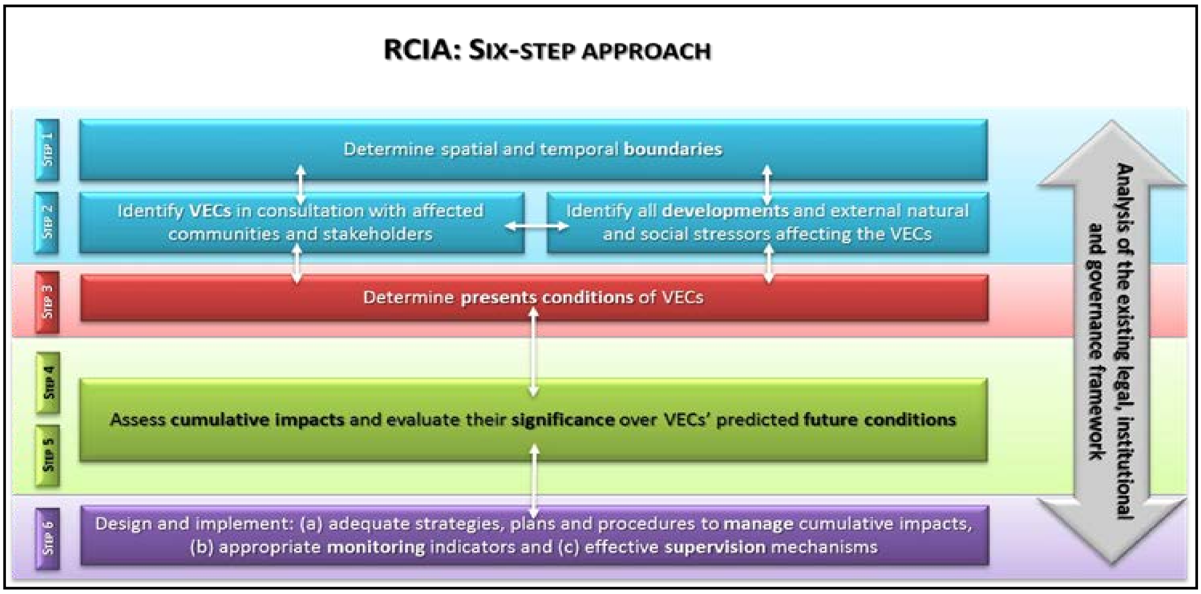

Figure 1-1: Cumulative impact assessment methodology

Appendix L: Summary of Consultations and Site Visits

Note: This Appendix contains two disclosure reports. Appendix L1 presents the findings of stakeholder consultations undertaken in 2016 as well as site visit observations. Appendix L2 presents the findings of stakeholder consultations undertaken in 2018.

Environmental and Social Management Framework for the Southern African Power Pool: Site Visit and Disclosure Report 1

November 2016

Executive Summary

The Southern African Power Pool (SAPP), established in 1995, was the first formal international power pool in Africa. SAPP's primary aim is to provide a reliable and economical electricity supply to the consumers of each of the sixteen SAPP utilities and Independent Power Producers (IPPs), consistent with the reasonable utilisation of natural resources and effects on the environment, and a stable interconnected electrical system. In 2009, SAPP completed the revision of the Pool Plan, which culminated in a list of priority power projects. A review of the status of project implementation in 2011 found that most of the selected priority power projects needed extra developmental work to bring them to bankability stage. The SAPP Coordination Centre (SAPP-CC) requested financial support from cooperating development partners to secure project preparation funds, resulting in a grant from the World Bank (IDA) to set up a Project Advisory Unit (PAU) that would accelerate the implementation of projects in the region. The objective of the acceleration programme is "*to be accountable for the preparation and implementation of selected and agreed priority regional electricity projects in the Southern African Power Pool region*".

One of the first tasks of the SAPP-PAU was to commission technical specialists to assist in preparing an Environmental and Social Management Framework (ESMF). The ESMF will act as a reference manual to assist in the high-level environmental and social screening of projects to strengthen the assessment, mitigation and management of risks and impacts. This tool is particularly relevant where project loans are required from international financial institutions that apply policies, standards and guidelines to safeguard environmental and social sustainability. The intention is that the ESMF will cater for priority power projects of different categories based on the extent and significance of the likely impacts and risks.

The ESMF for the SAPP acceleration programme was prepared in an iterative manner in the following three phases: phase 1 involving the preparation of an inception report and initial consultation in a workshop with the SAPP Environmental Sub-Committee (ESC); phase 2 involving the development of ESMF and Terms of Reference (TOR) following consultations with SAPP stakeholders, including member utilities, relevant government institutions and international financial institutions; and phase 3 involving the disclosure of the draft EMF to the SAPP stakeholders and its finalisation. During the development of the ESMF all relevant SAPP structures were consulted. Between June and October 2016 various stakeholder consultations are being conducted via workshops, site visits, focus group meetings, face-to-face, telephonic interviews and public hearings.

This ESMF is intended to benefit SAPP priority power projects through pre-feasibility, feasibility, planning and design studies initiated by member utilities. It will therefore largely be guided by the various national, regional and international environmental and social regulatory frameworks. Project proponents will also need to take account of the environmental and social safeguard policies, standards and guidelines of international financial institutions when seeking funding.

During implementation, the ESMF will assist project proponents to identify, assess and manage the environmental and social risks and impacts of the priority power projects. It will aid the SAPP utilities in aligning the development cycle of projects with environmental and social assessment procedures to ensure that: (1) there is early engagement between project planners and compliance staff responsible for environmental and social management, and (2) the requirements of relevant financial institutions are identified prior to commencing an environmental and social assessment. This approach will ensure that the material risks and impacts are identified at the planning stages of the project development cycle thus ensuring that environmental and social feasibility studies are appropriately scoped.

This report documents the two rounds of in-country missions conducted to i) consult with the SAPP Utilities and IPPs and relevant Ministries and view some of the key energy infrastructure in each country to understanding the specific local contexts, and ii) to workshop the draft ESMF with the Utilities and IPPs and relevant Ministries.

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Acknowledgements

Guidance: SAPP-Coordination Centre, SAPP-Environment Sub-Committee, SAPP-Project Advisory Unit

Report production and internal review: SRK Consulting South Africa

Map production: SRK Consulting

Technical input: SAPP member utilities, Ministries of Energy, Ministries of Environment, Environmental Authorities

Funding: World Bank (IDA)

List of abbreviations

EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ESC	Environmental Sub-Committee
ESIA	Environmental Social Impact Assessment
ESMF	Environmental and Social Management Framework
IPP	Independent Power Producers
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SRK	SRK Consulting (SA) (Pty) Ltd
ToR	Terms of Reference
WB	World Bank

1 Purpose of report

This report documents the internal capacity building and consultation undertaken with the SAPP ESC during the development of the ESMF and the two rounds of in-country missions conducted to

(i) consult with the SAPP utilities, IPPs, relevant ministries and regulators as well as view selected energy infrastructure in each country to understand the specific local contexts, and
(ii) to workshop the draft ESMF with the utilities, IPPs, relevant ministries and regulators.

2 Consultation and participation during the ESMF development phase

Consultation and participation were an integral component of the ESMF, occurring at all stages of its development and implementation.

2.1 Consultation and participation of SAPP structures

A number of SAPP structures were consulted during ESMF development. Two workshops were held in Johannesburg, South Africa with the SAPP-ESC; the first focusing on planning of the ESMF development process and the second to present the Draft ESMF and solicit comment. The SAPP-CC and SAPP-PAU were consulted on an ongoing basis regarding regional initiatives for cooperation on environmental and social management.

2.2 Consultation and participation of SAPP utilities and IPP and government partners during the ESMF development phase

Communication and consultation with SAPP utilities and IPPs was essential to ensure that the ESMF was tailored to the needs of these institutions. This consultation took the form of interviews with representatives in member utilities and their counterpart government institutions (i.e. respective ministries and departments governing energy and environment, environmental authorities responsible for reviewing Environmental and Social Impact Assessments (ESIAs) and issuing authorisations and/or licences). Missions were conducted to six SAPP member states (i.e. DRC, Mozambique, Namibia, South Africa, Tanzania and Zambia) to hold face-to-face meetings and conduct site visits to power generation and transmission facilities (where available or readily accessible) and meet with operation personnel. Teleconference interviews were conducted with the SAPP utilities, IPPs and their respective counterpart government institutions in the remaining SAPP member states (i.e. Lesotho, Botswana, Swaziland, Zambia and Mozambique). Table 2-1 provides a summary of the consultation and participation process during the ESMF development phase.

Table 2-1: Summary of consultation meetings during ESMF development

<table>
<tr><th>Deliverables</th><th>Key stakeholders</th><th>Date of meeting</th></tr>
<tr><td>Workshop 1</td><td>SAPP Utilities</td><td>30 June 2016</td></tr>
<tr><td rowspan="8">In country missions: Various meetings with select SAPP utilities and relevant ministries</td><td colspan="2">DRC</td></tr>
<tr><td>SNEL</td><td>7 July 2016</td></tr>
<tr><td>DRC Department of Environment</td><td>8 July 2016</td></tr>
<tr><td>DRC Ministry of Energy and Hydraulic Resources</td><td>8 July 2016</td></tr>
<tr><td colspan="2">Mozambique</td></tr>
<tr><td>EDM</td><td>25 July 2016</td></tr>
<tr><td>EDM Generation Directorate</td><td>26 July 2016</td></tr>
</table>

Deliverables	Key stakeholders	Date of meeting
	Ministry of Energy	26 July 2016
	Ministry of Environment	26 July 2016
	Namibia	
	NamPower	1 August 2016
	NamPower Transmission Division	1 August 2016
	SAIEA	1 August 2016
	Environmental Commissioner	1 August 2016
	South Africa	
	Eskom	29 July 2016
	Tanzania	
	Ministry of Mines and Energy	14 July 2016
	NEMC	14 July 2016
	TANESCO	14 July 2016
	Zambia	
	ZEMA	11 July 2016
	Zambezi River Authority	11 July 2016
	ZESCO	11 July 2016
Telephonic interviews with select SAPP utilities and relevant ministries	**Botswana**	
	BPC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	12 July 2016
	Department of Environment: Manager/s responsible for environmental impact assessment (EIA)	12 July 2016
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	12 July 2016
	Lesotho	
	LEC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	13 September 2016
	Department of Environment	13 September 2016
	Department of Energy	Utility was not able to arrange telecon
	Malawi	
	ESCOM: Managers for Generation Planning, Transmission Planning, & Financial Transactions	Utility was not able to arrange telecon
	Department of Environment: Manager/s responsible for environmental impact assessment	
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	
	Mozambique	
	Managers for Generation Planning, Transmission Planning, & Financial Transactions	9 September 2016
	Swaziland	
	SEC: Managers for Generation Planning, Transmission Planning, & Financial Transactions	27 September 2016
	Department of Environment: Manager/s responsible for environmental impact assessment	27 September 2016

Deliverables	Key stakeholders	Date of meeting
	Department of Energy: Manager/s responsible for energy policy, strategy and planning	27 September 2016
	Zimbabwe	
	Managers for Generation Planning, Transmission Planning, & Financial Transactions	Utility was not able to arrange telecon
	Ministry of Environment: Manager/s responsible for environmental impact assessment	
	Ministry of Energy and Power Development: Manager/s responsible for energy policy, strategy and planning	
Workshop 2	SAPP Utilities	21 - 22 September 2016

3 Site visit to selected energy infrastructure projects

During the in-country missions, several site visits were conducted to energy infrastructure projects (where available or readily accessible) to obtain an understanding of the local context and issues experienced in developing and implementing these projects. The countries selected for missions provided access to a range of energy generation (e.g. thermal, wind, solar, coal and nuclear) and transmission projects.

The team visited the following energy projects:

- Lingwala (urban), Liminga (urban) and Kimwenza (rural) sub-stations – Democratic Republic of Congo (DRC);
- Kariba hydroelectric scheme – Zambia/ Zimbabwe;
- Kinyerezi thermal power station – Tanzania;
- Omburu solar plant – Namibia;
- Van Eck coal power station – Namibia;
- Koeberg nuclear power station – South Africa; and
- Sere wind farm – South Africa.

Due to time constraints and the distance of the energy projects, a site visit was not undertaken in Mozambique. However, stakeholder consultation provided insights to the issues and challenges being experienced on a range of projects. Figure 3-1 provides a set of pictures of the energy projects visited during the in-country missions. Table 3-1: lists high-level observations and any key issues raised by site personnel.

 Kinyerezi thermal power station in Dar es Salaam, Tanzania	 Transmission lines in Kinshasa, DRC
 Sere wind farm in Western Cape, South Africa	 Omburu solar plant near Omaruru, Namibia
 Kariba hydroelectric scheme on the Zambesi River between Zambia/ Zimbabwe	 Van Eck coal power station in Windhoek, Namibia
 Kimwenza (Rural) outside Kinshasa, DRC	 Koeberg nuclear power station in Cape Town, South Africa

Figure 3-1: Energy infrastructure visited during the in-country missions

Table 3-1: Key observations and issues at visited energy projects

Energy projects visited	Key observations and issues raised
Lingwala (urban), Liminga (urban) and Kimwenza (rural) sub-stations, DRC	• Sub-stations and related transmission lines are being upgraded in close proximity to communities; • Servitudes for transmission lines in the urban areas have been encroached and structures built in close proximity to infrastructure; • People are farming under high voltage transmission lines and structures are in close proximity; • The rural sub-station at Kimwenza was difficult to access due to the condition of the local roads; and • Key issue will be the relocation of people working and or living within the designated servitude.
Kariba hydroelectric scheme, Zambia/ Zimbabwe	• It is a well-established facility, with hydro-electric facilities on either side of the Zambezi River; • Tourism resort developments are evident around Kariba Dam; • Due to design challenges with the existing sluice gates, water was not being released from the dam into the river; and • ZRA continue to receive complaints about historic resettlement and compensation.
Kinyerezi thermal power station, Tanzania	• New facility located within an urban area with open land for future expansion; • Storm water management infrastructure was well developed; • Health and safety signage was clearly visible throughout the facility; • There was evidence of housing encroachment around the power station with possessing a safety risk in the event of a fire or explosion; and • Enforcement of the exclusion zone around the facility is required.
Omburu solar plant, Namibia	• Located in a remote area; • Situated adjacent to an existing sub-station; • Surrounded by large game farms; • Highly visible from the surrounding area as a result of flat topography; and • Primary impact is loss of arable land.
Van Eck coal power station, Windhoek	• Located within the city of Windhoek surrounded by residential and industrial areas; • It is a well-run coal power station with established management systems and procedures; and • Management and monitoring of water and air emissions is a priority.
Koeberg nuclear power station, South Africa	• Located on the outskirts of the Cape Town metropolitan area, approximately 30km north of the city; • It is situated on Table Bay and surrounded by a nature reserve which serves as a buffer zone; • There is a strong emphasis on safety and security at the facility; • Monitoring of impacts on the marine environment is a key issue; and • Radioactive waste is being stored onsite with low and intermediate level wastes being transported to a dedicated facility for storage.
Sere wind farm, South Africa	• The wind farm is located in a remote and sensitive environment; • It is surrounded by large commercial farms; • Relations between the facility's management and landowners are reportedly good; and • Key impact on avifauna which is being monitored to determine frequency of bird collisions.

Note: The lessons learned and best practices relating to these projects are contained in Appendix C of the ESMF report.

3.1.1 Key findings

The following key findings were made during the in-country missions and telephonic interviews:

Institutional

- Many utilities are currently undergoing restructuring e.g. NamPower;
- Limited number of management level staff remain within most utilities;
- Transformation in many utilities is resulting in a skills exodus;
- Greater integration is needed between planning, engineering, finance and environment, health and safety (EHS) during project development;
- Changing management teams often resulting in changing plans; and
- Some utilities have dedicated departments or units with multiple staff responsible for the oversight of planning, environmental and social assessment, management and monitoring (e.g. ZESCO, NamPower, TANESCO, Eskom), whilst others have substantially less capacity (e.g. Escom).

Regulatory

- A lack of detailed energy legislation in certain countries is challenging, particularly regarding linear infrastructure (e.g. Mozambique);
- Compensation requirements are clearly stipulated and regulated in Tanzania and Mozambique, amongst other countries. At times, these requirements conflict with lender requirements. Such disconnects need to be reconciled to minimise delays in financing negotiations;
- Challenges include the length of time to approve projects or projects not being approved by government;
- On trans-boundary projects, increased communication between relevant state environmental regulators is needed to result in integrative decision-making. This is particularly relevant for transmission projects, but could equally apply for hydropower and any other generation types;
- Closer interaction between utilities and relevant ministries would improve project progress;
- Different ESIA methodologies are used across the region, which is problematic for transboundary projects such as transmission lines. This has resulted in regulators in adjacent countries approving transmission routes that do not align;
- Continuous flux is experienced between government planning for energy generation, transmission and distribution and the utilities’ planning processes. In some instances, government is quite reactive in its planning for the energy sector; and
- Environmental regulators have capacity constraints and sometimes lack understanding of international requirements.

Project planning

- For trans-boundary projects, different consultants undertake ESIAs for each country. There is consequently often a disparity between content and quality of the different country ESIAs for the same project;
- The ESMF should be applied by utilities to ensure alignment between the different components of transboundary projects;
- Silo mentality regarding project planning and implementation is limiting performance;
- Resettlement processes are length, costly and time consuming;
- Some utilities outsource their Environmental Social Impact Assessments (ESIAs) whilst others undertake the ESIAs internal, particularly for small-scale projects (e.g. ZESCO, TANESCO;
- Large funding requirements make it difficult to package projects as "bankable”;
- Project preparation often conducted by planners and engineers and does not include environmental and social personnel upfront;

- Some utilities do not meet with the various international funders during the project concept phase of projects, hence the ESIA processes (and reports) undertaken for utilities often require additional specialist studies and information; and
- Some of the utilities have experienced challenges associated with the alignment of in-country environmental and social requirements and the standards/safeguards of internal funders.

Financial

- Budget constraints pose challenges to utilities fully meeting environmental requirements;
- Funding of pre-feasibility, feasibility, construction and operation of energy projects is generally very costly and utilities believe the ESMF will help them write more conclusive reports to obtain funding; and
- Finances in utilities is a constraint, as utilities do not have enough money to finance all phases of energy projects.

Knowledge and experience

- Many of the utilities have a limited understanding of the requirements of international funders;
- Some of the utilities have limited experience in compensation, such projects with such requirements were last undertaken some time ago. However, others have extensive recent experience (e.g. TANESCO, EDM etc.);
- The utilities generally have knowledgeable personnel, but they have limited practical experience;
- There is a clear need in ESIAs to differentiate between risks and impacts and environmental and social staff in utilities collectively have a limited understanding of risks;
- Some utilities have challenges regarding the identification and management of social and heritage issues, as well as stakeholder engagement;
- A number of utilities have capacity, knowledge and/or experience constraints to develop resettlement action plans, which is affecting the implementation of such plans;
- Utilities have limited experience and understanding to address climate change issues;
- Some utilities conduct their own Environmental Social Impact Assessments (ESIAs), typically Category B and C projects. They generally outsource ESIAs (Category A projects) requiring international funding to independent environmental and social consultants;
- Consequently, the utilities have capacity building and training needs;
- The SAPP-PAU was identified as crucial in enabling and overseeing training and providing technical support to:
    - SAPP members (include E&S staff, planners and engineers);
    - National ministries of energy and environment; and
    - National environmental regulators.

Key areas for improvement regarding regulatory, technical, operational, institutional and social contexts included:

- Updating and improvement of environmental legislation to include and enable emerging energy technologies;
- Capacitation of utilities in emerging energy (e.g. concentrated solar power, geothermal, wind etc.) in the fields of engineering, finance and project management;
- Capacitation of technical personnel to undertake feasibility studies;
- Improvement of ESIA studies, Environmental Management Plans, licencing and implementation, including resettlement;
- Increase affected community engagement;
- Development of a regional regulatory body that evaluates the appropriateness of EIAs (principles, methodologies, Terms of Reference) at a regional level;

- Cost effective tariffs;
- Application of risk assessments for all projects; and
- Maintain projects regardless of management changes and only adjust projects details accordingly.

3.2 Consultation and participation in disclosing the ESMF

Disclosure of the draft ESMF took place to stakeholders through a series of half-day workshops to verify the contents and raise awareness about the purpose of the ESMF tool. The draft ESMF was also made available on the websites of SAPP, the utilities and SRK. The disclosure workshops were held in Botswana, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia.

Table 3-2: Summary of disclosure meetings

Deliverables	Key stakeholders	Date of meeting
In country disclosure missions	Zambia	17 October 2016
	Swaziland	1 November 2016
	Namibia	3 November 2016
	Mozambique	8 November 2016
	Botswana	11 November 2016
	South Africa	14 November 2016
	Tanzania	16 November 2016

3.2.1 Key findings

The following key findings were made during the disclosure workshops:

Project planning

- The various role-players in the utilities and IPPs need to work together in an integrated manner when planning a project and involve funders as soon as possible. There is also a need for a consistent approach to ESIAs across the region;
- Environmental and social staff need to be included on steering committees for transboundary projects from an early stage; and
- Greater harmonisation between country legislation across mainland Southern African Development Community (SADC) would facilitate stream-lining of projects.

Institutional arrangements

- The SAPP-ESC and ESMF was seen as a key vehicle for proactive engagement. Within SAPP, outside of the ESC, interaction between utilities is typically only taking place at a senior management level.

Legislation and policy

- In Mozambique there is major challenge regarding transmission lines, in that financial institutions want to see agreements in place for servitudes, but there is no formal process for agreeing on servitudes and rights of way in Mozambique. The energy sector legislation in Mozambique is outdated, as it dates back to the 1960s. In the absence of this legal framework there is a need for utilities to harmonise their own guidelines and approaches.

Training and Capacity Building

- It was requested that training be held specifically to assist the utilities in preparing ToRs, informed by the contents of the ESMF;
- Training for utilities must include financial staff;

- Climate Change training is needed for NamPower, who are still to develop a Climate Change Policy and Strategy; and
- Training for NamPower should ideally include the Regional Electricity Distributors if possible.

Knowledge Management

- The ESMF was viewed as an important manual to assist in preparing comprehensive TORs for “greenfield” and “brownfield” priority power projects. It could also be used as a reference document when reviewing TORs and specialist reports provided by a third party;
- Updates to the ESMF and SAPP Guidelines will be necessary to reflect revisions to legislation and the safeguards of financial institutions (e.g. World Bank); and
- Strategic tools, such as Strategic Environmental Assessments (SEAs), will be needed for some regions within countries to reconcile competing land uses, such as mining and geothermal energy generation.

4 Conclusions

This report reflects the various consultation and disclosure activities undertaken during the development of the SAPP ESMF, including the various site visits undertaken to understand the environmental, institutional and socio-economic settings associated with a subset of the key energy infrastructure in the region. The findings of the consultations, site visits and disclosure workshops were key informants to the development of the SAPP ESMF.

The full report SAPP ESMF should be consulted for further technical information.

Environmental and Social Management Framework for the Southern African Power Pool: Disclosure Report 2

Executive Summary

The Southern African Power Pool (SAPP), established in 1995, was the first formal international power pool in Africa. SAPP's primary aim is to provide a reliable and economical electricity supply to the consumers of each of the sixteen SAPP utilities and Independent Power Producers (IPPs), consistent with the reasonable utilisation of natural resources and effects on the environment, and a stable interconnected electrical system. In 2009, SAPP completed the revision of the Pool Plan, which culminated in a list of priority power projects. A review of the status of project implementation in 2011 found that most of the selected priority power projects needed extra developmental work to bring them to bankability stage. The SAPP Coordination Centre (SAPP-CC) requested financial support from cooperating development partners to secure project preparation funds, resulting in a grant from the World Bank (IDA) to set up a Project Advisory Unit (PAU) that would accelerate the implementation of projects in the region. The objective of the acceleration programme is "*to be accountable for the preparation and implementation of selected and agreed priority regional electricity projects in the Southern African Power Pool region*".

One of the first tasks of the SAPP-PAU was to commission technical specialists to assist in preparing an Environmental and Social Management Framework (ESMF). The ESMF will act as a reference manual to assist in the high-level environmental and social screening of projects to strengthen the assessment, mitigation and management of risks and impacts. This tool is particularly relevant where project loans are required from international financial institutions that apply policies, standards and guidelines to safeguard environmental and social sustainability. The intention is that the ESMF will cater for priority power projects of different categories based on the extent and significance of the likely impacts and risks.

The ESMF for the SAPP acceleration programme was prepared in an iterative manner in the following three phases: phase 1 involving the preparation of an inception report and initial consultation in a workshop with the SAPP Environmental Sub-Committee (ESC); phase 2 involving the development of ESMF and Terms of Reference (TOR) following consultations with SAPP stakeholders, including member utilities, relevant government institutions and international financial institutions; and phase 3 involving the disclosure of the draft EMF to the SAPP stakeholders and its finalisation. During the development of the ESMF all relevant SAPP structures were consulted. Between June and October 2016 various stakeholder consultations are being conducted via workshops, site visits, focus group meetings, face-to-face, telephonic interviews and public hearings.

This ESMF is intended to benefit SAPP priority power projects through pre-feasibility, feasibility, planning and design studies initiated by member utilities. It will therefore largely be guided by the various national, regional and international environmental and social regulatory frameworks. Project proponents will also need to take account of the environmental and social safeguard policies, standards and guidelines of international financial institutions when seeking funding.

During implementation, the ESMF will assist project proponents to identify, assess and manage the environmental and social risks and impacts of the priority power projects. It will aid the SAPP utilities in aligning the development cycle of projects with environmental and social assessment procedures to ensure that: (1) there is early engagement between project planners and compliance staff responsible for environmental and social management, and (2) the requirements of relevant financial institutions are identified prior to commencing an environmental and social assessment. This approach will ensure that the material risks and impacts are identified at the planning stages of the project development cycle thus ensuring that environmental and social feasibility studies are appropriately scoped.

This report documents additional stakeholder engagement conducted to: i) consult with relevant Civil Society Organisations (CSOs), funders, research and advocacy bodies to gain perspectives from a wider spectrum of society; and ii) to workshop the updated ESMF with SAPP Environmental Sub-Committee representatives.

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Acknowledgements

Guidance: SAPP-Coordination Centre, SAPP-Environment Sub-Committee, SAPP-Project Advisory Unit

Report production and internal review: SRK Consulting South Africa

Technical input: CSOs, funders, utilities, research and advocacy groups

Funding: World Bank

List of abbreviations

CSO	Civil Society Organisation
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMA	Environmental Management Agency
ESC	Environmental Sub-Committee
ESIA	Environmental Social Impact Assessment
ESMF	Environmental and Social Management Framework
IPP	Independent Power Producers
LEC	Lesotho Electricity Company
NGO	Non-Governmental Organisation
RAP	Resettlement Action Plan
SADC	South African Development Community
SAPP	Southern African Power Pool
SAPP-CC	Southern African Power Pool Coordination Centre
SAPP-ESC	Southern African Power Pool Environmental Sub-Committee
SAPP-PAU	Southern African Power Pool Project Advisory Unit
SRK	SRK Consulting (SA) (Pty) Ltd
ToR	Terms of Reference
WB	World Bank
ZESA	Zimbabwean Electricity Supply Authority

1 Purpose of report

This report documents the consultation undertaken during the ESMF update process to: i) consult with additional stakeholders, e.g. CSOs, research organisations, funders and advocacy bodies; and ii) to workshop the updated ESMF with the SAPP ESC, SAPP CC and SAPP PAU.

2 Consultation and participation during the ESMF update process

Consultation and participation were an integral component of the ESMF update, informing its development.

2.1 Consultation and participation of SAPP structures

During the process, a second disclosure workshop was held with representatives from SAPP CC SAPP ESC and SAPP PAU. Table 2-1 provides a list of workshop participants. The workshop was held in Johannesburg, South Africa and focused on the following objectives:

- Recap on the ESMF process in 2016;
- Planned activities for the ESMF update process;
- Overview of World Bank comments;
- Approach to updating the ESMF;
- Insights from additional stakeholder engagement;
- Lessons from case studies in the region; and

Key findings from the disclosure workshop are presented in section 2.3.

Table 2-1: List of workshop participants

Name and Surname	Organisation	Country
Chrispen Maseva	Zimbabwe Electricity Supply Authority (Chairman)	Zimbabwe
Annah Moncho	Botswana Power Corporation	Botswana
Gotsileone Mosimanegape	Botswana Power Corporation	Botswana
Caroline Sinkamba	Copperbelt Energy Corporation	Zambia
Aissa Naimo	Electricidade de Mocambique	Mozambique
Gertrude Malulu	Electricity Supply Corporation of Malawi	Malawi
Nercia Cuambe	Hidro Cahora Bassa	Mozambique
Matseliso Moremoholo	Lesotho Electricity Corporation	Lesotho
Nadia Haihambo	NamPower	Namibia
Johnson Maviya	Southern African Power Pool	Zimbabwe
Numbi Leya Aimee	Societe Nationale d'Electricite	DRC
Brenda Lulu Musonda Chizinga	ZESCO Limited	Zambia
Cosntance van Zuydum	Swaziland Electricity Company	Swaziland
Hamisi Boby	Tanzania Electricity Supply Company Ltd	Tanzania
Phindile Dlamini	ESKOM	South Africa
Nomasonto Mnisi	Southern African Power Pool	South Africa
Darryll Kilian	SRK Pty Ltd	South Africa
Natasha Anamuthoo	SRK Pty Ltd	South Africa
Cameron Dinnie	SRK Pty Ltd	South Africa

2.2 Consultation and participation with additional stakeholders

Communications with additional key stakeholders comprised telephonic interviews with relevant CSOs, including non-government organisations (NGOs) and advocacy bodies, research institutions, funders and utilities.

2.2.1 Selection of stakeholders

Additional stakeholders (e.g. CSOs, research organisations, utilities and funders) were identified and selected using the following criteria:

- Undertake advocacy activities related to energy in one or more countries in SADC;
- Active in community development projects in the energy sector in one or more countries in SADC;
- Conduct research on energy in one or more countries in SADC;
- Fund energy projects in one or more countries in SADC;
- Generate and/or distribute power within SADC; and
- A willingness to participate in the consultation process.

The process of stakeholder selection also took account of where organisations are located and/or active. This ensured that there was an equitable spread of stakeholders that reflected national and sub-regional issues and conditions.

Table 2-2 lists the eleven consultation interviews conducted during the ESMF update. Over twenty stakeholders were identified and selected but not all were contactable, readily available and/or willing to participate in the consultation process.

The key findings from consultations with additional stakeholders are presented in section 2.3.

Table 2-2: Summary of consultation interviews

Country	Key stakeholder	Type of organisation	Date of interview
Angola	RNT	CSO	30 May 2018
	REDE TERRA	CSO	22 May 2018
	PRODEL	Utility	14 June 2018
Cape Verde	Cabeolica	CSO	25 May 2018
Lesotho	Technologies for Economic Development (TED)	CSO	12 June 2018
DRC	University of Lubumbashi (UNILU)	Research	31 May 2018
Malawi	Centre for Environmental Policy and Advocacy (CEPA)	Advocacy group	25 May 2018
South Africa	The Council for Scientific and Industrial Research (CSIR)	Research	5 June 2018
Tanzania	Tanzanian Renewable Energy Association (TaREA)	CSO	25 May 2018
Southern Africa	Smart Development Works (SNV)	CSO	24 May 2018
	German Development Bank (KfW)	Funder	31 May 2018

2.3 Key findings

During the disclosure workshop and interviews key points arising from the discussions were captured and are appended to this report. Based on the discussion notes, the following key findings were made:

Institutional

- Environmental reporting standards of utilities are currently higher than those of the national regulators, e.g. Environmental Management Agency (EMA) of Zimbabwe, given that their reports need to meet international funder requirements;
- Governments are developing a streamlined approach to minimise the administration constraints associated with project development (e.g. a central point of entry established for developers in Tanzania);
- The environmental and social staff in utilities are intent to get involved at the early stages of project development and engage national regulators (e.g. LEC engaging regulator in Lesotho solar project);
- Greater integration is needed between departments within utilities, e.g. planning, engineering, finance and environment, health and safety (EHS), during project development; and
- There are utility capacity challenges for implementation. Some utilities have dedicated departments or units with multiple staff responsible for the oversight of planning, environmental and social assessment, management and monitoring (e.g. ZESCO, NamPower, TANESCO, Eskom), whilst others have substantially less capacity (e.g. Escom).

Regulatory

- Constraints to project development including regulations, land rights and tariffs must be considered and identified at an early stage;
- The ESMF will be helpful to assist utilities to meet international standards and requirements by informing the development of the ToR for the environmental and social impact assessments (ESIA);
- In some SADC countries national legislation requires revision, e.g. the Malawian Mining Act of 1992 needs an updated stakeholder engagement process; and
- Different ESIA methodologies and environmental and social standards are used across the region, which is problematic for transboundary projects such as transmission lines and hydro power projects.

Project planning and stakeholder participation

- It is important to identify project alternatives at an early stage, e.g. location, design, technology and routing, to inform decision making;
- There is a need to engage early with key stakeholders, notably CSOs, to inform alternative assessment, e.g. a wind farm project was halted due to objections from an NGO dealing with bearded vultures;
- The ESMF is a tool designed for “ideal world” circumstances and users should will need to take account of real world challenges that arise, e.g. transboundary projects may have permits with different validity periods;
- Local conditions of a proposed project should be fully understood;
- Environmental and social risks, including constraints arising from climate change, must be identified at an early stage;
- Environmental impact assessment (EIA) processes are a critical step in the project development process;
- All projects must include the principles of inclusion, participation and transparency;
- Vulnerable groups need to be acknowledged in the stakeholder engagement process;
- Resettlement has historically been overlooked during project planning which has resulted in funding delays, e.g. Luanda transmission line construction;
- Displacement, resettlement and compensation is a complex process that requires frequent stakeholder engagement and information capturing;

- Major costs and delays arise when alternatives are not fully assessed, e.g. incorrect design specifications of the Medupi power station's back filters;
- Safety is important and needs to be identified in the early planning stages to avoid delays, e.g. areas where there is unexploded ordinance; and
- Monitoring is a critical component of environmental management plans, e.g. Avifauna monitoring for wind power projects.

Financial

- The involvement of investors at the early stages of the project is beneficial in streamlining the development process;
- It proves challenging when various funders are involved at different stages of the development process;
- It is important to identify funder requirements at an early stage; and
- Project development for energy infrastructure is generally very costly and if not carefully conceived and implemented, there is a possibility that important issues may be missed and need to be rectified with significant cost and time implications.

Research

- There is extensive research being undertaken in the energy sector (e.g. energy technologies, demand and supply, energy storage, green energy);
- Research is being undertaken to screen key locations for renewable energy and to identify key sensitivities, e.g. cultural heritage;
- Research is focusing on the energy market to provide the most cost-effective technologies and efficient methods for implementation; and
- Universities are assisting utilities and IPPs with technical advice and review.

3 Conclusions

This report presents the process followed in consulting additional stakeholders and outlines the key findings from interviews with funders, CSOs, utilities, research institutions and advocacy groups, as well as discussions with the SAPP ESC during the disclosure workshop. In conclusion, the following key issues were identified and need to be taken into consideration during project development and implementation:

- The early stages of development are crucial to projects' overall success;
- Alternatives should be considered during the project screening and planning phases;
- Climate change issues and challenges must be considered when planning a project;
- National legislation requires updates and revision to ensure alignment with good international industry practice relating to environmental and social assessments;
- The environmental and social assessment capabilities of certain utilities need to be strengthened;
- Resettlement and compensation issues should be identified at the early planning stages and prioritised to avoid project delays; and
- Stakeholder engagement needs to be integrated into all stages of the project development process and should include CSOs, project affected persons and lenders.

The updated ESMF report should be consulted for further technical information.

List of contributors

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Lesotho Electricity Corporation (Lesotho)
Electricity Supply Corporation of Malawi (Malawi)
Swaziland Electricity Company (Swaziland)
Zimbabwe Energy Regulatory Authority (Zimbabwe)
Hidroeléctrica de Cahora Bassa (Mozambique)
Copperbelt Energy Corporation (Zambia)
Public Electricity Production Enterprise (Angola)
Cabeólica S.A (Cape Verde's)
Empresa Pública de Produção de Electricidade (Angola)

SADC ministries, agencies and authorities

Botswana Ministry of Environment, Wildlife and Tourism
Botswana Ministry of Minerals, Energy and Water Resources
DRC Ministry of Environment, Conservation of Nature and Tourism
DRC Ministry of Energy and Hydraulic Resources
Lesotho Department of Environment
Lesotho Department of Energy
Mozambique Ministry of Land, Environmental and rural Development
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Namibia Ministry of Environment and Tourism
Namibia Ministry of Mines and Energy
Tanzania Ministry of Energy and Minerals
Tanzania National Environmental Management Council
Zambia Environmental Management Agency
Zambia Ministry of Energy
Zambezi River Authority
Swaziland Ministry of Environment
Swaziland Ministry of Natural Resources and Energy

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Tanzania Renewable Energy Association (Tanzania)
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Development financial institutions

World Bank (WB)
Japanese International Cooperation Agency (JICA)
African Development Bank (AfDB)
European Investment Bank (EIB)
Development Bank of Southern Africa (DBSA)
Royal Norwegian Embassy (RNB)
International Finance Cooperation (IFC)
Chinese Development Bank (CDB)
Swedish International Development Agency (SIDA)
German Development Bank (KfW)