



REPÚBLICA DE ANGOLA
MINISTÉRIO DA ENERGIA E ÁGUAS
REDE NACIONAL DE TRANSPORTE DE ELECTRICIDADE

HUILA-CUNENE INTERCONNECTION PROJECT (HCIP) - P512716

**under the REGIONAL ENERGY TRANSMISSION,
TRADE AND DECARBONIZATION (RETRADE) MPA**

Environmental and Social Scoping Study Cahama- Ondjiva Transmission Line

Rede Nacional de Transporte de Electricidade

18 September 2025

Resumo Executivo

Introdução

O Ministério da Energia e Águas de Angola (MINEA) irá desenvolver o Sistema de Transporte do Cunene (STC) através do Projecto Interligando Huila Cunene, que consiste numa linha de Transporte aérea de 200 km e infraestruturas conexas para alargar o corredor de Transporte de 132 kV existente entre a Namíbia e Angola para a província angolana do Cunene. Os principais objectivos da CTS são aumentar a capacidade de Angola para importar e exportar energia no âmbito do Polo Energético da África Austral (SAPP) e apoiar o desenvolvimento de Projectos de energias renováveis liderados por produtores independentes de energia (IPPs).

O Governo de Angola (GdA) solicitou financiamento ao Banco Internacional para a Reconstrução e o Desenvolvimento (BIRD) do Banco Mundial para implementar o Projecto Interligando Huila Cunene no âmbito da abordagem regional do MPA e do caso do comércio inter-regional de energia - o Projecto Regional de Transporte, Comércio e Descarbonização de Energia (RETRADE). O Projecto será implementado pela Agência de Transporte de Electricidade do MINEA (Rede Nacional de Transporte de Electricidade - RNT), em coordenação com a SAPP, através de uma unidade de implementação do Projecto (PIU) que será estabelecida.

Foram preparados estudos ambientais e sociais preliminares – ou seja, o Estudo de Definição do Âmbito Ambiental e Social (E&S) para o Projecto, a fim de identificar os principais riscos e impactos E&S associados ao Projecto e informar o âmbito da AIAS, incluindo os estudos de base necessários. Este Projecto de Relatório de Definição do Âmbito Ambiental e Social serve de apoio ao Estudo de Definição do Âmbito Ambiental e Social.

Contexto do Projecto

O crescimento da população de Angola levou a um aumento da procura de energia para fins residenciais, comerciais e industriais. O desenvolvimento económico do país, particularmente através da industrialização e urbanização, aumentou ainda mais a necessidade de um fornecimento fiável de energia. Apesar destas exigências, os frequentes cortes de energia e a falta de fiabilidade do acesso à Electricidade em algumas partes do país continuam a impedir as actividades económicas e a afectar a qualidade de vida.

O Projecto insere-se na estratégia mais vasta de electrificação de Angola, que visa melhorar o acesso a fontes de energia mais limpas e com menos emissões. O Projecto procura alcançar este objectivo reduzindo os custos de Transporte através de opções de rotas alargadas e minimizando o risco de interrupções no fornecimento. Espera-se que o reforço das infraestruturas energéticas de Angola através do Projecto promova o crescimento económico, reduza a pobreza e melhore a qualidade de vida global dos cidadãos angolanos.

Além disso, o Projecto está em conformidade com os objectivos da SAPP. A SAPP é uma iniciativa de cooperação que liga as redes eléctricas dos países membros da África Austral. A integração da infraestrutura energética de Angola na SAPP não só aumenta a segurança e a fiabilidade energética regional, como também facilita o comércio transfronteiriço de energia, promovendo assim uma rede eléctrica mais resiliente e interligada em toda a região.

Benefícios do Projecto

O Projecto é uma componente fundamental da estratégia mais ampla de electrificação de Angola, concebida para melhorar o acesso a fontes de energia mais limpas e com menos emissões, reduzir os custos de transporte através de mais opções de rotas e minimizar o risco de interrupções no fornecimento. Ao reforçar a infraestrutura energética do país, o Projecto

visa apoiar o crescimento económico, reduzir a pobreza e melhorar a qualidade de vida dos cidadãos angolanos. Se o status quo persistir, as emissões de GEE prevalecerão, uma vez que a energia continuará a ser procurada através de fontes não renováveis devido à falta de infraestruturas de ligação à rede para escoar a energia gerada a partir de instalações de energias renováveis.

Outros benefícios do Projecto incluem algumas oportunidades limitadas de emprego durante a fase de construção.

Descrição do Projecto

A LT e as suas infraestruturas associadas estendem-se por toda a província do Cunene, no sul de Angola. Partindo de Ondjiva, a capital da província, e seguindo na direção noroeste, a linha de transporte de 220 kV passa pela cidade de Xangongo e, por fim, liga-se à rede eléctrica angolana existente em Cahama. O Projecto inclui também a construção de duas subestações, uma em Xangongo e outra em Ondjiva, bem como um ramal de alimentação na subestação de Cahama.

A RNT está a investigar um corredor de 2 km de largura para a LT, do qual é necessária uma servidão de 60 m para a construção, manutenção e operação seguras da linha.

Alternativas do Projecto

Foram avaliadas três opções alternativas de corredor utilizando um processo de tomada de decisão multicritério (MCDM) para determinar o corredor preferido de uma perspectiva técnica, ambiental e social. A abordagem MCDM envolveu a identificação de critérios ou parâmetros específicos. Cada opção de corredor provisoriamente selecionada foi avaliada em função destes critérios, que incluíam factores como a viabilidade técnica, o impacto ambiental e a aceitabilidade social. O corredor com a pontuação mais elevada, com base nesta avaliação exaustiva, foi finalmente selecionado como a via preferida.

A alternativa «sem Projecto» é a opção de não desenvolver a LT de Cahama-Ondjiva e as infraestruturas associadas, prevalecendo o status quo. Esta alternativa não teria qualquer impacto adicional no meio recetor. No entanto, os benefícios do Projecto também não serão concretizados.

Requisitos regulamentares

É necessária uma AIAS para o Projecto, em conformidade com a legislação nacional angolana e com as Normas Ambientais e Sociais do BIRD (ESS). Prevê-se que o BIRD classifique os Riscos Ambientais e Sociais do Projecto como «Substanciais».

Existem várias outras legislações significativas que foram consideradas na preparação deste Relatório de Definição do Âmbito Ambiental e Social, incluindo, mas não se limitando a:

- A Lei de Terras de Angola, Lei n.º 09/04
- A Lei de Bases do Ambiente de Angola, Lei n.º 5/98
- O Decreto Presidencial de Angola sobre o Processo de Licenciamento Ambiental (Decreto Presidencial n.º 117/20)
- Normas de Sustentabilidade e Desempenho Social e Ambiental das Corporações Financeiras Internacionais (2012) e Política de Acesso à Informação (2012);
- Diretrizes de Ambiente, Saúde e Segurança (EHS) do Grupo do Banco Mundial; e
- Boas Práticas Internacionais da Indústria (GIIP), entre outras.

Considerações ambientais e sociais

Ambiente Biofísico

A Área de Influência do Projecto abrange duas ecorregiões terrestres: as Florestas de Baikiaea da Zambézia e as Florestas de Mopane de Angola. Nesta área, duas Áreas Importantes para as Aves e a Biodiversidade (IBAs) - os Parques Nacionais de Mupa e Bicuar - foram designadas a norte e estão também classificadas como Áreas Chave para a Biodiversidade (KBAs). Estas regiões apresentam uma elevada riqueza de espécies, em especial de espécies com restrições biológicas da Zambézia, como o calau-de-bico-pálido, o chapim-do-mato, a carriça-do-mato e o estorninho-de-bico-branco. Os extensos habitats das zonas húmidas de planície de inundação na área suportam pelo menos 31 espécies de aves aquáticas, incluindo o grou-de-bico-vermelho, globalmente ameaçado. Estes habitats podem facilitar os movimentos regulares de aves aquáticas entre o sul de Angola e as zonas húmidas mais a sul, potencialmente intersectando a área do Projecto.

Além disso, vinte e seis espécies ameaçadas de aves, mamíferos, peixes e plantas têm distribuições que se sobrepõem à área do Projecto, destacando a biodiversidade significativa dentro da área do Projecto.

Considerações sociais

A área do Projecto inclui cidades e regiões populosas onde numerosos residentes podem ser afectados pelas actividades de desenvolvimento. Pode ser necessário um Plano de Acção de Reassentamento (RAP) e/ou um Plano de Restauração dos Meios de Subsistência (LRP) para mitigar quaisquer impactos adversos nas comunidades locais.

Há uma série de receptores sensíveis nas proximidades da área do Projecto. Como tal, são necessárias mais considerações sobre a saúde e a segurança da comunidade na AIAS.

Recomendações-chave

Existem alguns impactos inevitáveis no ambiente receptor, como acontece com qualquer desenvolvimento desta natureza. A opção de prosseguir com a LT é superior à opção “Sem Projecto”. Este Relatório de Definição do Âmbito Ambiental e Social apresenta um TdR para a fase seguinte da avaliação, que inclui investigações especializadas detalhadas, consultas às partes interessadas e a preparação de um Relatório de Avaliação do Impacto Ambiental e Social (AIAS), juntamente com um Plano de Gestão Ambiental e Social (PGAS) e um RAP / LRP.

Executive Summary

Introduction

The Angolan Ministry of Energy and Water (MINEA) will develop the Cunene Transmission System (CTS) through the Huila-Cunene Interconnection Project. The project will finance activities to extend the power transmission capacity to the southern region of Angola and enable integration with the Southern African Power Pool (SAPP). The Project will consist of a 200 km overhead transmission line (OHTL) and related infrastructure to extend the existing 132 kV transmission corridor between Namibia and Angola into Angola's Cunene Province. The primary goals of the CTS project are to enhance Angola's capacity to import and export energy within the Southern African Power Pool (SAPP) and to support the development of renewable energy projects led by independent power producers (IPPs).

The Government of Angola (GoA) has sought funding for this Project from the International Bank for Reconstruction and Development (IBRD) to implement the Huila-Cunene Interconnection Project under the regional MPA approach and the inter-regional power trade case - the Regional Energy Transmission, Trade and Decarbonization Project (RETRADE). The Project will be implemented by MINEA's agency of Electricity Transport (Rede Nacional de Transporte de Electricidade - RNT), in coordination with SAPP, through a Project Implementation Unit to be established.

An Environmental and Social (E&S) Scoping Study for the Project was undertaken to identify key E&S risks and impacts associated with the Project and to inform the scope of the ESIA, including the baseline studies required. This draft E&S Scoping Report is in support of the E&S Scoping Study.

Project Context

Angola's population growth has led to increased energy demand for residential, commercial, and industrial purposes. The country's economic development, particularly through industrialization and urbanization, has further escalated the need for reliable energy supplies. Despite these demands, frequent power outages and unreliable electricity access in some parts of the country continue to impede economic activities and affect quality of life.

The Project aligns with Angola's broader electrification strategy aimed at improving access to cleaner energy sources with lower emissions. It seeks to achieve this by reducing transmission costs through expanded route options and minimising the risk of supply interruptions. Strengthening Angola's energy infrastructure through the Project is expected to bolster economic growth, reduce poverty, and enhance the overall quality of life for Angolan citizens.

Furthermore, the Project is in line with the SAPP's objectives. SAPP is a cooperative initiative connecting the power grids of member countries in Southern Africa. Integrating Angola's energy infrastructure into SAPP not only enhances regional energy security and reliability but also facilitates cross-border energy trade, thereby fostering a more resilient and interconnected power network across the region.

Project Benefits

The Project is a key component of Angola's broader electrification strategy designed to improve access to cleaner energy sources with lower emissions, reduce transmission costs through increased route options, and minimise the risk of supply interruptions. By bolstering the Country's energy infrastructure, the Project aims to support economic growth, alleviate poverty, and enhance the quality of life for Angolan citizens. Should the status quo persist, GHG emissions will prevail as energy will continue to be sought through non-renewable sources due to a lack of grid connection infrastructure to evacuate power generated from renewable energy facilities.

Other Project benefits include some, limited employment opportunities during the construction phase.

Project Description

The OHTL and its associated infrastructure extend throughout the Cunene Province in southern Angola. Starting from Ondjiva, the provincial capital, and running in a north-westerly direction, the 220 kV transmission line passes through the city of Xangongo and ultimately links to the existing Angolan electricity network in Cahama. The Project also includes the construction of two substations; one in Xangongo, and one in Ondjiva, as well as a feeder bay in Cahama substation.

RNT are investigating a 2 km wide corridor for the OHTL, of which a 60 m servitude is required for the safe construction, maintenance and operation of the line.

Project Alternatives

Three alternative corridor options were assessed using a Multi-Criteria Decision Making (MCDM) process to determine the preferred corridor from a technical, environmental, and social perspective. The MCDM approach involved the identification of specific criteria or parameters. Each provisionally selected corridor option was evaluated against these criteria, which included factors such as technical feasibility, environmental impact, and social acceptability. The highest-scoring corridor, based on this comprehensive evaluation, was ultimately selected as the preferred route.

The 'No-Project' alternative is the option of not developing the Cahama-Ondjiva OHTL and associated infrastructure and where status quo would prevail. This alternative would result in no additional impact on the receiving environment. However, the benefits of the Project will also not be realised.

Regulatory Requirements

An ESIA is required for the Project in accordance with National Angolan legislation, and the WBG Environmental and Social Standards (ESS). The Project has been rated as a Substantial under the Environment and Social Risk Classification. There are several other significant legislation that have been considered in the preparation of this E&S Scoping Report including, but not limited to the:

- The Angolan Land Law, Law No. 09/04
- The Angolan Environmental Framework Law, Law No. 5/98
- The Angolan Presidential Decree on the Environmental Licencing Process (Presidential Decree no. 117/20)
- International Finance Corporations' Social and Environmental Sustainability and Performance Standards (2012) and Access to Information Policy (2012);
- World Bank Group 's Environmental, Health and Safety (EHS) Guidelines; and
- Good International Industry Practice (GIIP), amongst others.

Environmental and Social Considerations

Biophysical Environment

The Project's Area of Influence encompasses two terrestrial ecoregions: the Zambebian Baikiaea Woodlands and the Angolan Mopane Woodlands. Within this area, two Important Bird and Biodiversity Areas (IBAs) - Mupa and Bicuar National Parks - have been designated to the north and are also classified as Key Biodiversity Areas (KBAs). These regions exhibit

high species richness, particularly of Zambezian biome-restricted species such as the Pale-billed Hornbill, Miombo Tit, Miombo Wren-warbler and White-winged Babbling Starling.

Extensive floodplain wetland habitats in the area support at least 31 species of waterbirds, including the globally threatened Wattled Crane. These habitats may facilitate regular movements of waterbirds between southern Angola and wetlands further south, potentially intersecting the Project area.

Moreover, twenty-six threatened birds, mammals, fish, and plant species have distributions that overlap with the Project area, highlighting the significant biodiversity within the Project area.

Social Considerations

The Project area includes populated cities and regions where numerous residents might be affected by the development activities. A Resettlement Action Plan (RAP) and/or a Livelihood Restoration Plan (LRP) may be required to mitigate any adverse impacts on the local communities.

There are a number of sensitive receptors in close proximity to the Project area. As such, further community health and safety considerations are required in the ESIA.

Key Recommendations

There are some unavoidable impacts to the receiving environment, as with any development of this nature. The option to proceed with the OHTL outweighs the 'No-Project'. This E&S Scoping Report presents a ToR for the next phase of assessment, which includes detailed specialist investigations, stakeholder consultation and the preparation of an Environmental and Social Impact Assessment (ESIA) Report together with an Environmental and Social Management Plan (ESMP) and RAP / LRP.

Table of Contents

Resumo Executivo	ii
Executive Summary	v
Glossary	xiv
Acronyms and Abbreviations	xvii
1.0 Introduction	1
1.1 Background	1
1.2 Project Context and Alignment with Policies	3
1.3 Scope of the Study	4
1.4 The ESIA Process	4
1.4.1 Environmental and Social Scoping Study	6
1.4.2 Next Steps.....	6
1.5 Project Team Details	7
1.5.1 Proponent.....	7
1.5.2 Financing Partners	7
1.5.3 Environmental Consultants.....	7
2.0 Project Description	8
2.1 Site Location	8
2.2 Land Ownership	9
2.3 Project Components.....	9
2.3.1 Transmission Line and Towers (Pylons)	9
2.3.2 Foundations	10
2.3.3 Conductors.....	10
2.3.4 Insulators.....	10
2.3.5 Stringing of Conductors	10
2.3.6 Substations	10
2.4 Right of Way.....	11
2.5 Project Activities	11
2.5.1 Preparation Phase.....	11
2.5.2 Construction Phase	11
2.5.3 Operational Phase.....	12
2.5.4 Decommissioning Phase	12
2.6 Materials and Resources.....	12
2.6.1 Access	12
2.6.2 Temporary Laydown Areas and Facilities	13
2.6.3 Water Supply.....	13

2.6.4 Power Supply	13
2.6.5 Waste Management	13
2.6.6 Personnel	14
2.7 Project Timeline.....	14
2.7.1 Construction	14
2.7.2 Life of the Project	14
3.0 Project Alternatives.....	15
3.1 Overview	15
3.2 Site / Route Alternatives	15
3.3 Design Alternatives	18
3.4 Technology Alternatives	18
3.5 No-Project Alternative	20
4.0 Policy and Legal Framework	21
4.1 Overview	21
4.2 Key National Acts, Laws and Policies.....	21
4.3 Regional Policies and Agreements	26
4.4 International Conventions, Standards, Guidelines and Practises.....	28
5.0 Description of the Existing Environment.....	34
5.1 Physical Environment.....	34
5.1.1 Climate	34
5.1.2 Geomorphology	37
5.1.3 Topography	38
5.1.4 Hydrology	38
5.1.5 Air Quality.....	40
5.2 Biophysical Environment	40
5.2.1 Terrestrial Ecoregions	40
5.2.2 Natural and Modified Habitat	41
5.2.3 Ecologically Important Areas	44
5.2.4 Potentially Occurring Threatened Flora and Fauna	47
5.3 Socio-Economic Environment.....	54
5.3.1 Administrative Context.....	54
5.3.2 Demographic Profile	56
5.3.3 Economic Indicators	58
5.3.4 Access to Services	61
5.3.5 Overview of Urban Centres within the Project Area	62
5.3.6 Potentially Vulnerable Persons or Groups	63

5.3.7 Human Rights	64
5.3.8 Cultural Heritage	65
6.0 Stakeholder Consultation, Participation and Disclosure.....	66
6.1 Overview	66
6.2 Stakeholder Identification, Analysis and Mapping.....	66
6.3 Scoping Study Engagement	67
6.4 Next Steps.....	68
7.0 Potential Environmental and Social Risks and Impacts.....	69
7.1 Overview	69
7.2 Pre-construction and Construction Phase Risk Impacts	70
7.3 Operational Phase Risks and Impacts.....	74
7.4 Decommissioning, Closure and Rehabilitation Phase Risks and Impacts.....	77
7.5 Potential Cumulative Risks and Impacts.....	77
8.0 Resettlement Scoping.....	78
8.1 Overview.....	78
8.2 Legal and Policy Alignment	79
8.3 Potential Displacement Impacts	80
8.4 Scope of Land Acquisition and Resettlement	81
8.4.1 Physical Displacement Requirements	81
8.4.2 Economic Displacement Requirements.....	81
8.5 Compensation Framework and Entitlement Matrix	87
8.5.1 Resettlement Principles.....	87
8.5.2 Eligibility and Entitlement Framework.....	87
8.6 Process for Preparing a Resettlement Action Plan	88
9.0 Terms of Reference for the ESIA.....	90
9.1 Overview.....	90
9.2 ESIA Objectives	90
9.3 Approach to Undertaking the ESIA Study.....	90
9.1.1 Authority Consultation	90
9.1.2 Project Area of Influence	90
9.1.3 ESIA Process and Tasks.....	91
9.1.4 Specialist Studies	91
9.1.5 Impact Assessment and Mitigations	94
9.4.6 Stakeholder Engagement.....	98
9.4.7 Environmental and Social Management Plan	100
10.0 Conclusion.....	102

10.1 Key Findings	102
10.1.1 Biophysical Considerations	102
10.1.2 Social Considerations.....	102
10.1.3 Project Benefits	102
10.2 Key Recommendations	103
10.3 Assumptions and Limitations	103
11.0 References.....	103

Tables in Text

Table 1-1: Proponent Details	7
Table 3-1: Possible Alternative Technologies for Structures	19
Table 4-1: Key National Acts, Plans and Policies Considered	21
Table 4-2: Regional Policies and Agreements	26
Table 4-3: Other Guidelines and Conventions Applicable	31
Table 4-4: Applicability of IBRD ESS	32
Table 5-1: Prevailing Wind Direction and Speed in the Project Aol	34
Table 5-2: Maximum and Minimum Monthly Air Temperatures in the Ondjiva	36
Table 5-3: Maximum and Minimum Monthly Air Temperatures in the Xangongo	36
Table 5-4: Maximum and Minimum Monthly Air Temperatures in the Cahama	36
Table 5-5: Average Monthly Amount of Rainfall in Ondjiva	37
Table 5-6: Average Monthly Amount of Rainfall in Xangongo	37
Table 5-7: Average Monthly Amount of Rainfall in Cahama	37
Table 5-8: Description of the Morphological Landforms of the Cunene Province	37
Table 5-9: General Topography along the Aol	38
Table 5-10: Main Geohydrological Features in Projects Aol	38
Table 5-11: Description of Surface Water in the Aol	39
Table 5-12: Potentially Occurring Threatened Species in the Vicinity of the Project Area	50
Table 5-13: Administrative Levels within the Project Area	54
Table 5-14: Population in the Project Area	56
Table 5-15: Employment Status of Population aged 15 years and Older	59
Table 5-16: Multidimensional Poverty Index	60
Table 6-1: Key Stakeholder Groups Identified	66
Table 6-2: Key Stakeholder Groups and Approach	67
Table 7-1: Pre-Construction and Construction Phase Risks / Aspects, Impacts, Mitigation and Recommendations	70
Table 7-2: Operational Phase Risks / Aspects, Impacts, Mitigation and Recommendations	74
Table 8-1: Gap Analysis between Angolan Legislation and World Bank ESS Requirements	79
Table 8-2: Potential Displacement Impacts	80
Table 9-1: ESIA Process and Tasks	91
Table 9-2: ToR for Specialist Studies	91
Table 9-3: Impact Significance Determination	94
Table 9-4: Categorisation and Description of Additional Assessment Criteria	98
Table 9-5: Stakeholder Engagement Requirements	99

Figures in Text

Figure 1-1: Project Locality	2
Figure 1-2: ESIA Process in Angola	5
Figure 1-3: ESIA Flow Chart	6

Figure 2-1: Project Locality	8
Figure 2-2: Typical Pylon Configurations	9
Figure 3-1: Corridor Route Options	16
Figure 3-2: Summary of the MCDM Process Undertaken	17
Figure 3-3: Preferred Corridor Selected	18
Figure 3-4: Typical Monopole Type Structure (A), H-Frame Type Structure (B), Lattice Type Structure (C), Self-Supporting Type Structure (D) and Guyed Type Structure (E)	19
Figure 4-1: Members of the SADC Power Pool Policy	27
Figure 5-1: Wind Rose in Ondjiva	34
Figure 5-2: Wind Rose in Xangongo	35
Figure 5-3: Wind Rose in Cahama	35
Figure 5-4: Surface Water Resources in the Project Aol	39
Figure 5-5: Location of the Project Area within Global Terrestrial Ecoregions	42
Figure 5-6: Natural and Modified Habitat along the Cahama – Xangongo and Xangongo – Ondjiva Routes	43
Figure 5-7: Location of the Project Area in relation to Protected Areas and Key Biodiversity Areas	45
Figure 5-8: Occurrence Records of Critically Endangered and Endangered Species in the Vicinity of the Project Area	53
Figure 5-9: Administrative Boundaries	55
Figure 5-10: Gender Breakdown (2024)	57
Figure 5-11: Gender Breakdown (Projected)	57
Figure 5-12: Literacy Levels within Angola and the Project Area	58
Figure 6-1: Stakeholder Engagement Approaches	67
Figure 7-1: Mitigation Hierarchy	69
Figure 8-1: Areas of Settlement within the Preferred Corridor between Cahama and Xangongo	83
Figure 8-2: Areas of Settlement within the Preferred Corridor between Xangongo and Ondjiva	84
Figure 8-3: Areas of Cropland within the Preferred Corridor between Cahama and Xangongo	85
Figure 8-4: Areas of Cropland within the Preferred Corridor between Xangongo and Ondjiva	86
Figure 8-5: Process for the Preparation of a RAP	89

Glossary

Term	Definition
Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.
Alternative	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Area of Influence	The area affected by a development project, which is beyond the project footprint. The area of influence is determined by a project's resource requirements and the nature and magnitude of its impacts, and it may vary across different development phases of a project.
Aquatic	Relating to or living in water.
Avifauna	The birdlife of a particular region or habitat.
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Conductor	Conductors are the pathways that carry the electric current over vast distances.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.
Critical Habitat	Any area of the planet with high biodiversity conservation significance based on the existence of habitat of significant importance to critically endangered or endangered species, restricted range or endemic species, globally significant concentrations of migratory and/or congregatory species, highly threatened and/or unique ecosystems and key evolutionary processes. Critical habitats are any area of the planet with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.
Cross Arm	Transmission line cross arms support and position the conductors.
Cumulative Impact	The impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decommissioning	Decommissioning means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.
Direct Impact	Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.
Ecosystem	A dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.
Electromagnetic Fields	Radiation associated with the use of electric power such as household wiring, electric appliances and also from OHTL. Electric fields are produced from the voltage in the transmission line while magnetic fields are produced from the electric current.

Term	Definition
Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes, or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Impact	Change to the environment (biophysical, social and/or economic), whether adverse or beneficial, wholly, or partially, resulting from an organisation's activities, products or services.
Environmental and Social Impact Assessment	Environmental and social impact assessment consists of a multidisciplinary approach, which combines the evaluation of the economic aspects of a project - based on cost-benefit ratios - with the environmental consequences of undertaking the project. It is 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.
Environmental and Social Management Plan	The main objective of the Environmental and Social Management Plan is to outline measures to be taken to mitigate potential negative impacts and enhance positive impacts identified in an Environmental and Social Impact Assessment.
Environmental Management	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.
Foundations	Transmission line foundations provide the crucial anchor point for the towering structures that hold overhead lines aloft.
Groundwater	Water in the ground that is in the zone of saturation from which wells, springs, and groundwater run-off are supplied.
Hydrology	The science encompassing the behaviour of water as it occurs in the atmosphere, on the surface of the ground, and underground.
IFC Performance Standard	The IFC Performance Standards are an international benchmark for identifying and managing environmental and social risk and has been adopted by many organisations as a key component of their environmental and social risk management.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Indigenous	Originating or occurring naturally in a particular place - native.
Mitigate	The implementation of practical measures designed to avoid, reduce, or remedy adverse impacts or enhance beneficial impacts of an action.
No-Go Option	In this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Clearance.
Overhead Transmission Line	A structure used to transmit electrical power over long distances, typically between a power generation facility and a sub-station.
Proponent	The project developer responsible for submitting an environmental application to the relevant environmental authority for environmental clearance.
Re-use	To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.
Rehabilitation	A measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.
Sensitive Environments	Any environment identified as being sensitive to the impacts of the development.
Significance	Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and

Term	Definition
	likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e., biophysical, social and economic).
Stakeholder Engagement	The process of engagement between stakeholders during the planning, assessment, implementation and/or management of proposals or activities.
Sustainable Development	Development which meets the needs of current generations without hindering future generations from meeting their own needs.
Tower	Towers on a transmission line, also known as pylons or masts, play a crucial role in supporting and maintaining the overhead lines that carry electricity across long distances. They hold these high-voltage cables aloft, ensuring uninterrupted flow of power and protecting them from damage caused by weather, terrain, and other factors.
Transmission Line	A transmission line is a specialised cable or structure designed to conduct electromagnetic waves in a contained manner.

Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
AHP	Analytic Hierarchy Process
Aol	Area of Influence
AZE	Alliance for Zero Extinction
BMP	Biodiversity Management Plan
CHA	Critical Habitat Assessment
CITES	Convention on the International Trade of Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CR	Critically Endangered
CTS	Cunene Transmission System
E&S	Environmental and Social
EBA	Endemic Bird Area
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EL	Environmental License
EN	Endangered
ESIA	Environmental and Social Impact Assessment
ESIAP	Electricity Sector Improvement and Access Project
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
ESSR	Environmental and Social Scoping Report
GBV	Gender Based Violence
GBIF	Global Biodiversity Information Facility
GHG	Greenhouse Gasse
GIIP	Good International Industry Practice
GoA	Government of Angola
HIV/ AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
I&AP	Interested and Affected Party
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IBA	Important Bird and Biodiversity Areas
IBRD	International Bank of Reconstruction Development
IFI	International Finance Institution
IFC	International Financial Corporation
ILO	International Labour Organisation
IPP	Independent Power Producers
ITCZ	Intertropical Convergence Zone

Acronym/ Abbreviation	Definition
KBA	Key Biodiversity Areas
KV	Kilovolt
MASL	Meters Above Sea Level
MCDM	A Multi-Criteria Decision Making
MINAMB	Ministério do Ambiente (Ministry of Environment)
MINEA	Ministério da Energia e Águas (Ministry of Energy and Water)
MPI	Multidimensional Poverty Index
MW	Megawatts
NDC	Nationally Determined Contribution
NEPAD	New Partnership for Africa's Development
NP	National Park
OECD	Organisation for Economic Co-operation and Development
OHTL	Overhead Transmission Line
PAP	Project Affected Person
POP	Persistent Organic Pollutant
PPE	Personal Protective Equipment
PS	Performance Standards
RAP	Resettlement Action Plan
REPTUR	Regulamento Geral dos Planos Territoriais, Urbanísticos e Rurais (Regulation for Urban and Rural Territorial Plans)
RNT	Rede Nacional de Transporte de Electricidade
RoW	Right of Way
SAPP	Southern African Power Pool
SCC	Species of Conservation Concern
SDG	Sustainable Development Goal
SEA/SH	Sexual Exploitation and Abuse and/or Sexual Harassment
SEP	Stakeholder Engagement Plan
STD	Sexually Transmitted Disease
SWMP	Stormwater Management Plan
ToR	Terms of Reference
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
VU	Vulnerable
WBG	World Bank Group
WHO	World Health Organisation

1.0 Introduction

1.1 Background

As part of the Angola-Namibia (ANNA) Transmission Interconnection Project the Government of the Republic of Angola (GoA's) programme for the electricity sector improvement, will implement the Huila Cunene Interconnection Project under the Regional Energy Transmission, Trade and Decarbonization Project (RETRADE) to connect the Angolan and Namibian power systems to increase the power transfers within the Southern African Power Pool (SAPP) network and to increase the stability in the power pool and to leverage the development of renewable energy projects through independent power producers (IPPs).

The ANNA project is a 400 kV overhead transmission line, with a total length of approximately 362 km, extending from the proposed Kunene substation in Namibia, to the proposed Lubango substation in Angola, of which 331 km will be located in southern Angola, with the remaining 31 km in Namibia. In Angola the Huila Cunene Interconnection Project will cover the development of the Cunene Transmission System (CTS) - a 200 km overhead transmission line (OHTL) and supporting infrastructure which extends the existing 132 kilovolt (kV) transmission corridor between Namibia and Angola to the Cunene Province in Angola (Figure 1-1).

Permanent project components include the electrical infrastructure (substations and control buildings, transformers, transformer bays, line bays, busbars, reactive power compensation, etc.), the pylons that will support the overhead transmission line, foundations to support the pylons, powerline markers, and access roads and servitude areas (a minimum servitude of 27.5 meters will be required, with a 20 meter wide strip cleared of trees and obstacles within the servitude).

The Huila Cunene Interconnection Project objective is to strengthen power transmission capacity and enable regional integration through private capital mobilization.

The Project is being implemented by the Ministry of Energy and Water through the Rede Nacional de Transporte de Electricidade (RNT) as the Proponent.

In Angola, the Project will be implemented by the Ministry of Energy and Water through the Rede Nacional de Transporte de Electricidade (RNT) as the Proponent, in articulation with ANNA project co-ordinated by SAPP, and NambPower as the Proponent on the Namibia side.

The ANNA projects aims to alleviate the current electricity supply constraints and to contribute towards the security of energy supply by enhancing the distribution of electricity in the region, for which Huila Cunene Interconnection Project will contribute to increase electricity transmission capacity to integrate the SAPP.

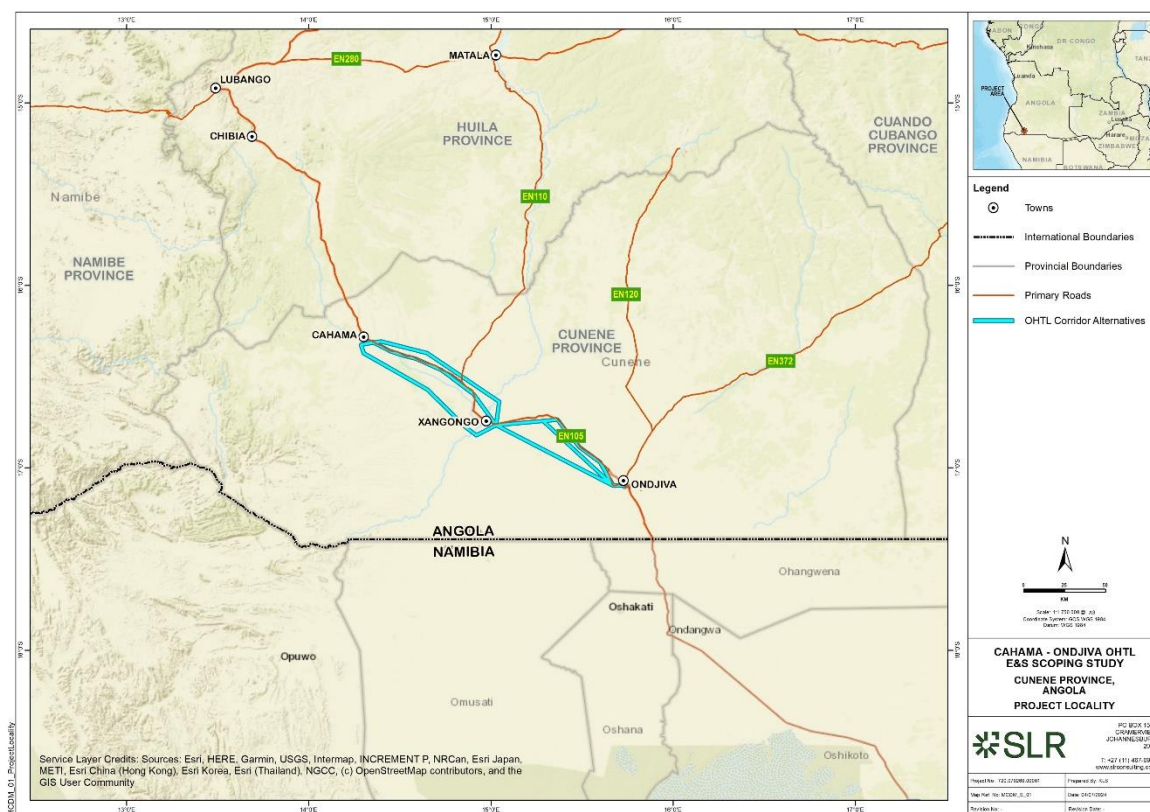


Figure 1-1: Project Locality

The Project is a key component of Angola's broader electrification strategy designed to improve access to cleaner energy sources with lower emissions, reduce transmission costs through increased route options, and minimise the risk of supply interruptions. By bolstering the country's energy infrastructure, the Project aims to support economic growth, alleviate poverty, and enhance the quality of life for Angolan citizens.

Moreover, the Project aligns with the objectives of the SAPP, a cooperative initiative that connects the power grids of member countries in Southern Africa. By integrating Angola's energy infrastructure with SAPP, the Project not only enhances regional energy security and reliability but also facilitates cross-border energy trade, promoting a more resilient and interconnected power network across the region. This collaboration is crucial for leveraging shared resources, optimising energy distribution, and fostering sustainable development in southern Africa.

From its conception, the ANNA Project has had the objective of promoting the highest positive economic, social and environmental impact possible whilst ensuring that all negative social and environmental impacts are addressed by avoiding negative impacts or, where they can't be avoided, minimising and compensating over-and-above the estimated impacts. This philosophy aims to ensure that the project attains a positive social and environmental impact and contributes to the overall sustainable development of Angola and Namibia.

SLR Consulting Africa (Pty) Ltd (SLR) in partnership with Holisticos have been appointed to undertake an Environmental and Social (E&S) Scoping Study for the development of the Project as the first step in an E&S Impact Assessment (ESIA) process. The Scoping study is undertaken in accordance with World Bank's Environmental and Social Standards (ESS).

The main objective of the E&S Scoping study is to identify key E&S risks and impacts associated with the Project and to inform the scope of the ESIA, including the baseline studies required.

1.2 Project Context and Alignment with Policies

Angola's population has been growing rapidly, increasing the demand for energy to support residential, commercial, and industrial activities. As Angola continues to develop its economy, particularly through industrialization and urbanisation, the demand for reliable and sufficient energy supplies has surged¹. Frequent power outages and unreliable electricity supply have hindered economic activities and affected quality of life².

To address these challenges, the Angola 2025 Long Term Strategy was established, setting global strategic objectives for the energy sector³. This strategy includes the 2013-2017 Action Plan for Energy, aiming to achieve 60% basic energy access by 2025. A crucial component of this strategy is the implementation of a renewable energy development policy during the 2015-2025 period. The key goals of the policy include:

- Increase the national electrification rate by approximately 60% by 2025, thereby increasing electricity access;
- Boost installed electricity production capacity by 9 900 MW by 2025 and reducing dependence on fossil fuels;
- Increase the share of renewables to enhance energy security and sustainability; and
- Transition to a more sustainable energy system.

The Angolan National Development Plan 2023-2027 builds on the foundations laid by the Long-Term Strategy by focusing on increasing the electrification rate and improving electricity infrastructure. The Plan aims to raise the electrification rate from 43% in 2022 to 49% by 2027, with a long-term goal of 72% by 2050; with more aggressive targets and specific projects aimed at improving access to electricity across the country⁴.

The overall vision addresses challenges such as frequent power outages and unreliable electricity supply by investing in new generation capacity and improving transmission and distribution networks across the country.

In addition, the Project aligns with Angola's commitments to the SAPP, actively enhancing regional energy integration and cross-border electricity trade.

The Project will support the following government objectives:

- Expand the Angolan national grid to Cunene Province.
- Reduce the diesel generation costs in Cunene Province.
- Allow renewable energy projects interaction into the grid.
- Provides an alternate corridor for the SAPP network.
- Provide the extension of the telecommunication network.

¹ Solarin, S. A. et al., 2016

² Abotsi, A.K., 2016

³ Angola's Power Sector long term vision (2016). Available at: <https://gestoenergy.com/wp-content/uploads/2018/04/ANGOLA-POWER-SECTOR-LONG-TERM-VISION.pdf>. Accessed 14 June 2024

⁴ The Energy Year: Angola closes in on its 2022 electrification targets. Available at: <https://theenergyyear.com/articles/angola-closes-in-on-its-2022-electrification-targets/>

1.3 Scope of the Study

The Project consists of the following components:

- Construction of a 220 kV transmission line of approximately 200 km from Cahama through Xangongo to Ondjiva (within a 2 km corridor width);
- Construction of a 220/60 kV intermediate substation in Xangongo;
- Construction of a 220/132 kV substation in Ondjiva; and
- Supply and installation of a 220 kV feeder bay in Cahama substation.

1.4 The ESIA Process

The environmental consent process for this Project is regulated by Angola's local requirements, namely the Environmental Framework Law (Law No. 5/98, of 19 July), the Environmental Impact Assessment Regulation (Presidential Decree No. 117/204, of 22 April).

It is anticipated that the Project will be categorised as a category "A" according to Angolan Legislation – Presidential Decree No. 117/20 of 22 April). For Projects classified as Category A, a scoping report is required as well as the development of the Terms of Reference (ToR) for the ESIA report.

The ESIA process in Angola is summarised in Figure 1-2.

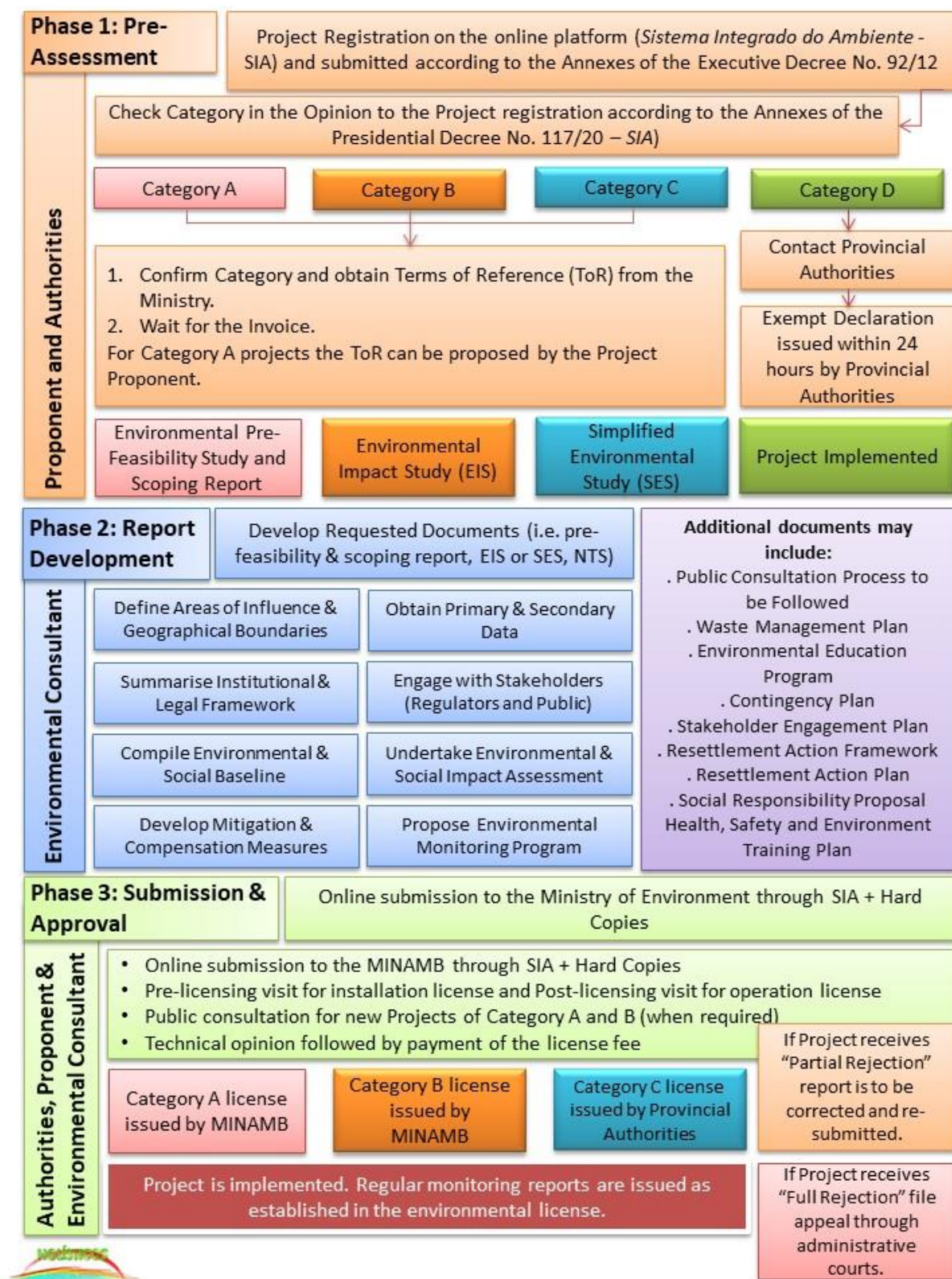


Figure 1-2: ESIA Process in Angola

The ESIA process is being undertaken in the following phases (Figure 1-3):

- **Phase 1:** Compilation of an E&S Scoping Report inclusive of a Resettlement Scoping chapter – *this report*;
- **Phase 2:** Compilation of an ESIA Report; Non-Technical Summary, Waste Management Plan and Environmental and Social Management Plan (ESMP); and
- **Phase 3:** Application for Environmental Installation License and Public Consultation.

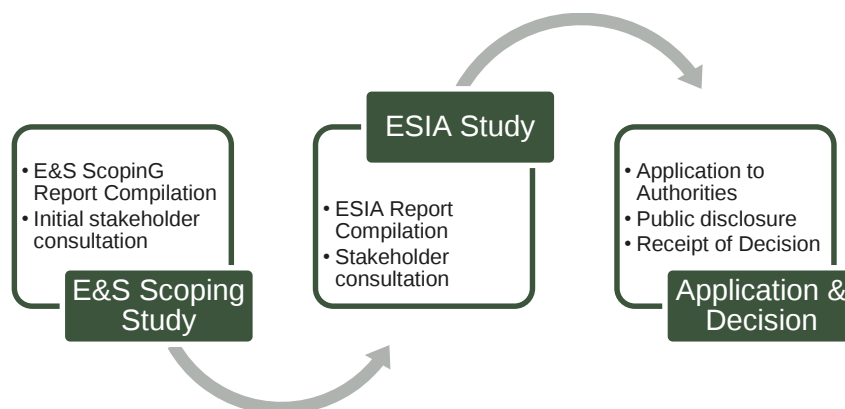


Figure 1-3: ESIA Flow Chart

1.4.1 Environmental and Social Scoping Study

The objectives of the E&S Scoping Report are to:

- Provide a project description of the activity including all reasonable and feasible alternatives, alternative means of carrying out the operations and the consequence of not proceeding with the proposed activity;
- Detail the need for and desirability of the project proposal including advantages, disadvantages and alternatives;
- Describe key national and international legislation, policies and guidelines that have been considered in the preparation of the E&S Scoping Report;
- Detail the current state of the receiving environment;
- Identify and describe the anticipated E&S impacts, including cumulative impacts in respect to the Project;
- Determine the measures needed to prevent, minimise, mitigate and compensate adverse impacts, and identify potential E&S opportunities, including those that would improve the E&S sustainability of the Project;
- Detail the process of engagement with identified Interested and Affected Parties (I&As) and Project Affected Persons (PAPs); and
- Inform Project design based on E&S considerations.

1.4.2 Next Steps

An ESIA study will be undertaken as Phase 2 for the assessment. The ESIA will build on the outcomes and findings of this E&S Scoping Report.

1.5 Project Team Details

1.5.1 Proponent

RNT will be the owner and operator of the Project. The Public Company, RNT, was created under the Electricity Transformation Program under Presidential Decree No. 305/14 of 20 November, following the established in Security Policy Energy Agency, approved by Presidential Decree No. 256/11 of 29 September.

Details of the Proponent are provided in Table 1-1.

Table 1-1: Proponent Details

Project Proponent	Rede Nacional de Transporte de Electricidade	
Contact Person	Eudes Panzo	
Postal Address	Luanda, Subestação do Camama, Luanda, Angola	
Telephone No.	+244 923 227 640	
Email Address	efpanzo@rnt.co.ao eudes@rnt-piu.co.ao	

1.5.2 Financing Partners

The GoA is seeking financing from the IBRD towards the cost of the Project. The IBRD is one of five member institutions that make up the World Bank Group (WBG). Established in 1944, the IBRD works in close cooperation with other international financial institutions (IFIs) to support the transition towards open market-oriented economies and to promote private and entrepreneurial initiative⁵. The IBRD invests in a variety of sectors including renewable energy projects and promotes energy efficiency, with the goal of making a positive impact on the lives of people in its investment regions⁶.

1.5.3 Environmental Consultants

SLR in collaboration with Holisticos have undertaken the E&S Scoping Study.



SLR is a global E&S advisory firm with an extensive track record of supporting developers and lenders in their pursuit of developing and financing energy, extractive and infrastructure projects globally.

Holisticos is an Angolan environmental consultancy offering a wide range of services including the preparation of E&S impact studies, environmental audits and the development of various plans throughout the national territory, both at sea and on land.



⁵ The International Bank for Reconstruction and Development. <https://www.worldbank.org/en/who-we-are/ibrd>. Accessed 14 June 2024

⁶ Accelerating Sustainable and Inclusive Economic Growth (2023) <https://www.worldbank.org/en/about/annual-report/our-work>. Accessed 14 June 2024

2.0 Project Description

2.1 Site Location

The Project is located in the Cunene Province in south-west Angola. It consists of a 220 kV overhead transmission line (OHTL) connecting the planned Cahama substation via Xangongo to the existing Ondjiva substation and the transmission will have two transmission line components as described hereunder.

The selected corridor (2 km wide) for the planned transmission starts near the planned Cahama substation just south of Cahama and runs east for 6.5 km and then turns south-east closely following the EN110 road route crossing Cunene River after another 82 km and turning slightly towards the proposed Xangongo substation just east of the town of Xangongo for a total Cahama – Xangongo route length of 92.7 km. From Xangongo substation, it then continues south-east for 77.5 km, turning east for another 8.2 km to the existing Ondjiva substation for a total route length of 85.7 km. The total corridor length is 183.4 km.

The Area of Influence (AoI) for the E&S Scoping Study is a 2 km wide corridor (i.e. 1 km strip either side of the centre line of the proposed OHTL) to ensure sufficient coverage for anticipated design changes and allow some flexibility for micro-siting at later stages of the Project. However, the OHTL will be constructed within a 60 m wide servitude within the 2 km assessment corridor. It is estimated that a 15 m wide area will need to be cleared from all vegetation and obstacles to create a service road and ensure the line has sufficient clearance to vegetation.

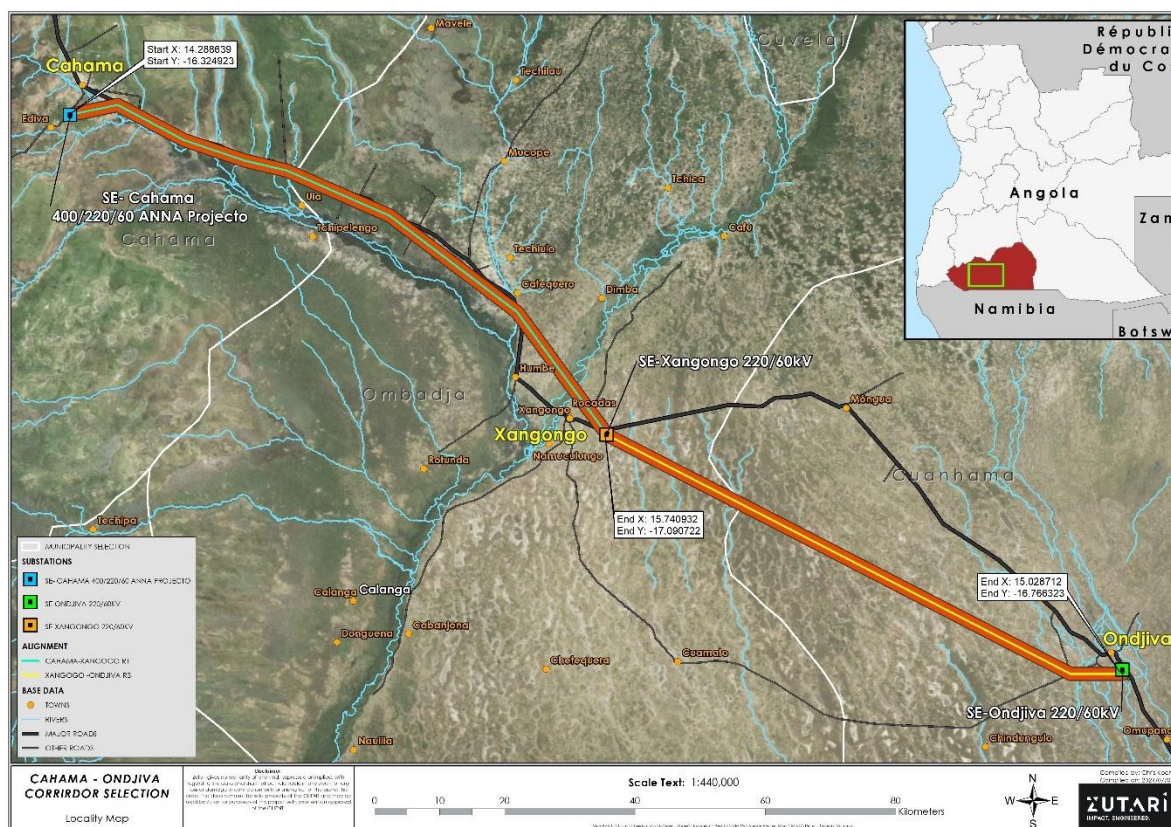


Figure 2-1: Project Locality

2.2 Land Ownership

It assumed that the land in the study area is mostly owned by the Government.

2.3 Project Components

The Project will consist of a double circuit 220 kV OHTL connecting the planned Cahama substation, via the planned Xangongo substation, to the existing Ondjiva substation with an approximate route length of 183.4 km.

An OHTL is a structure used to transmit electrical power over long distances, typically between a power generation facility and a substation. OHTLs consist of one or more conductors (typically in multiples of three) suspended by towers or poles. The various components of the OHTL are described hereunder.

2.3.1 Transmission Line and Towers (Pylons)

The main component of the OHTL is the transmission line and towers.

Various types of pylon structures can be used (as described in **Section 3**), depending on the landscape, engineering and the biophysical environment. The pylons could be in staggered vertical or horizontal configuration. The final pylons sizes and positions will only be determined once the Project has received the Environmental Installation Licence, once negotiations with landowners (if required) have been finalised, and detailed geotechnical assessments and a pre-construction E&S walk-through has been completed. The final pylon positions will take into consideration any sensitive areas and/or no-go areas identified by the ESIA and during the walkthrough before construction. Pylons will be selected and installed in accordance with the latest industry standards, and according to RNT's technical requirements at the time of construction, within the parameters of this assessment. Pylons will vary between 54.5 m and 24 m in height and the distance between each pylon will be between 250 m and 350 m, depending on terrain.

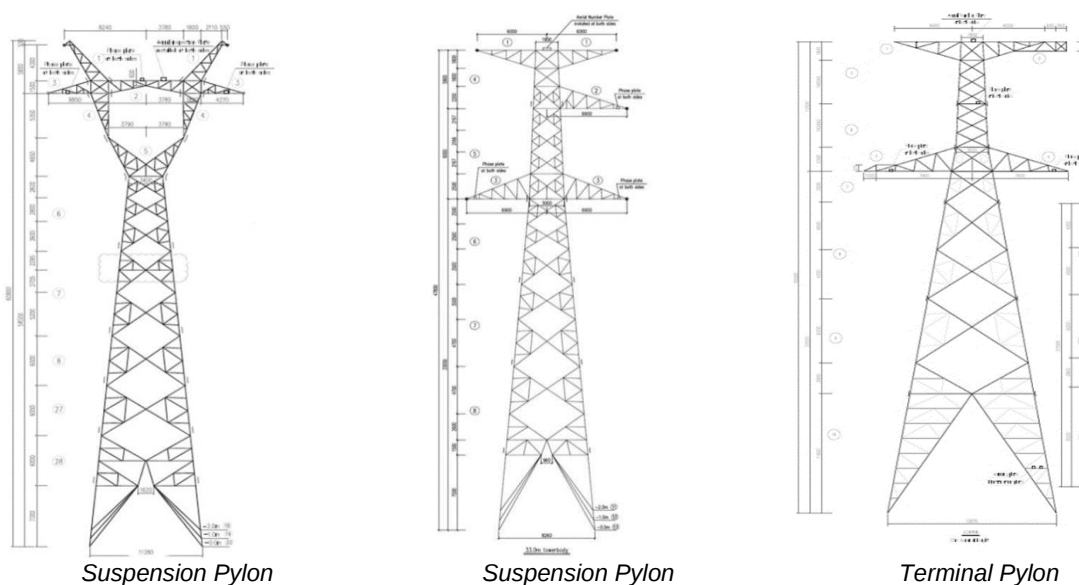


Figure 2-2: Typical Pylon Configurations

Each transmission tower will consist of the following:

- **Foundations:** each tower will be fixed and bolted to the ground through reinforced concrete foundations. The exact area for each foundation will be determined at a later stage as part of the detailed design; and
- **Cross-Arms:** each tower will have steel beam cross arms which connects the conductors with the towers.

2.3.2 Foundations

The choice of foundation is influenced by the type of terrain encountered and the underlying geotechnical conditions. The actual size and type of foundation will depend on the soil bearing capacity (actual sub-soil conditions).

The footprint of each pylon foundations will be up to 8 m x 10 m and foundations may be up to a maximum depth of 4 m. The total construction footprint for the foundations will be 15 m x 15 m. Foundations will occupy only small portions of the servitude footprint, and the remainder of the footprint will remain open. The foundation types and depths vary based on the pylons, type of soil, and type of terrain (rock).

2.3.3 Conductors

The conductor is the line that carries electrical energy from one tower to the next until its connection with the High Voltage National Grid. The conductors are made of aluminium with a steel core for strength. Power transfer is determined by the area of aluminium in the conductors. Conductors are used singularly, in pairs, or in bundles of three, four or six. The size of conductor to be used is based on the initial and life-cycle costs of different combinations of size and bundles, as well as the required load to be transmitted.

An All-Aluminium Alloy Conductor (AAAC) of a size still to be selected will be used.

2.3.4 Insulators

Glass or composite conductors will be used to connect the conductors to the towers depending on the environmental conditions and RNT preference.

Glass and porcelain are the most common, but these products are heavy and susceptible to breakage by vandals and contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. Composite insulators are lightweight and resistant to both vandalism and pollution.

2.3.5 Stringing of Conductors

The stringing of conductors will be according to standard international practice using a winch to pull and tension the conductors running the conductors over sets of pulleys attached to each tower and eventually attaching each conductor or conductor bundle to an insulator string suspended from the tower.

2.3.6 Substations

The Cahama substation will be a 400/220/60kV substation to be built under the ANNA Project (for which approvals have been obtained) and will be extended with a 220kV feeder bay to provide for this Project.

The Xangongo substation will be a new 220/60 kV intermediate substation.

The existing 132/30kV substation at Ondjiva will be extended to become a 220/132/60/30kV substation.

The substation areas will include all the standard substation electrical equipment / components, such as transformers and bus bars and will also house control, operational, workshop and storage buildings / areas. The footprint of each substation will be in the order of 300 m x 200 m.

2.4 Right of Way

Electricity transmission and distribution projects require a right of way (RoW) or servitude to protect the system from windfall, contact with trees, branches, utilities, buildings, and other potential hazards that may result in damage to the system, or power failures, as well as public health and safety concerns.

The WBG Environmental Health and Safety (EHS) Guidelines for Electric Power Transmission and Distribution⁷, states that the RoW for transmission lines ranges from 15 to 100 m depending on voltage and proximity to other RoWs, but a typical range is between 15 and 30 m.

A final servitude of 60 m wide will be determined through an optimal routing and design (including tower spotting). The OHTL route will traverse within the 2 km wide corridor taking technical, environmental and social factors into consideration.

2.5 Project Activities

2.5.1 Preparation Phase

The following activities will take place once the necessary environmental licences are in place:

- Determining of the servitude area (route) through an iterative process considering technical and ESIA inputs.
- Determining substation sites and dimensions.
- Selection of best suited pylons and foundations.
- Detailed survey to fix alignment.
- Soil investigations of selected pylon locations to inform foundation design.
- Final design and survey / placement of exact pylon locations.
- Final design of substation configurations.
- Pegging of pylon positions and substation sites.

2.5.2 Construction Phase

The construction is anticipated to last for 24-30 months and will be done according to construction methodologies and/or specifications of RNT. In summary, this Phase will entail the following activities:

- Mobilisation of workers, machinery and construction equipment.
- Survey and development of access roads.
- Setup of construction camp(s).

⁷ World Bank Group. (2007). *EHS Guidelines for Electric Power Transmission and Distribution*, WBG.

- Clearing of vegetation and stripping of the topsoil in the construction camp(s), construction site(s), substations and at each pylon location.
- Transport of all the required materials, equipment and components to the camp(s) and each substation and pylon location. Movement and operation of heavy machinery and equipment.
- Waste production and management.
- Clearing the servitude of trees and vegetation.
- Surveying and pegging of pylon locations and substation sites.
- Earthworks associated with the pylon and substation foundations / platforms.
- Construction of concrete foundations to support the pylons (including installation of earth connection and installation of support bases) and equipment in the substations.
- Building and assembling of all the required equipment and structures inside the substation areas (usually undertaken by highly qualified teams), including associated buildings and security fencing.
- Assembly and erection of pylons using temporary laydown areas at each pylon.
- Laying of cables, line signalling, aerial beacons and bird guards, which entails unrolling, adjusting and securing of the cables, using the areas around the pylons or between the pylons and, if crossing over or beneath obstacles (namely roads, rails and other aerial lines), set up of temporary protective structures.
- Commissioning of the substations, which involves carrying out several tests to ensure that the equipment and the protection and control systems are properly installed and functioning correctly before the substation commences operation.
- Demobilisation of construction work sites and rehabilitation of the affected areas.

2.5.3 Operational Phase

During the lifespan of at least 40 years of the OHTL and substations, ongoing maintenance will occur on a daily, weekly, monthly and yearly base. Even after this period, the equipment might be refurbished and kept in service. The maintenance includes visual inspections driving the OHTL route regularly.

2.5.4 Decommissioning Phase

This Phase if the equipment life is not extended will consist of:

- Disassembly of towers, conductors and substations equipment.
- Removal of equipment.
- Rehabilitation and waste clearance.

2.6 Materials and Resources

2.6.1 Access

Access to the substations sites will be *via* access roads already constructed or the be constructed for the new substations (Xangongo). These roads must be able to cater for heavy loads for the transport of transformers to the substation sites. A temporary construction road will be created in the OHTL RoW for the full length of the route. This road will be accessed by existing roads in the Project area.

2.6.2 Temporary Laydown Areas and Facilities

A construction camp and temporary storage facilities for the housing of construction workers, equipment and materials will be created at one or more of the substation sites for the purpose of the substation and line construction. During construction, temporary laydown and site camp areas will be required. They will serve as logistical centres for construction activities along a given length of the line. A number of camps may be required. The approximate size of each camp is 5 000 m² (0.5 ha). The camps will be restricted to the minimum size practically required to facilitate construction and will be preferentially located in already disturbed (cleared) locations.

Selection of the laydown areas will be done in consultation with RNT's environmental representative. The temporary construction camp and lay down areas will be rehabilitated once construction is complete.

Each camp is expected to include the following components:

- A site office, consisting of prefabricated units.
- Accommodation (if located far from settlements), consisting of prefabricated units.
- Eating and ablution facilities.
- Laydown areas for infrastructure.
- Concrete mixing plant.
- Storage facilities for materials, equipment or waste.
- Equipment parking area.
- Power supply (generator).
- Fuel storage containers for generators and vehicles.
- Water supply (borehole or water treatment plant, or a water tank).
- Security fencing.

A sewage package plant and/or or French drains for treated sewage disposal may be required, depending on the Contractor's approach, some smaller temporary construction facilities might be created along the OHTL route, and most likely within the RoW, as the construction progress along the route.

2.6.3 Water Supply

It is standard practise to install some permanent water supplies at substations using boreholes or municipal water supplies and stored in tanks. The water supplies required for the OHTL construction will be transported by tankers to each position and water will be drawn from nearby sources (dams, waterholes, boreholes).

2.6.4 Power Supply

Mobile generators will most likely be used for the construction of the OHTL as the site is an ever-moving location. RNT might be able to provide temporary power supplies at the 3 substation sites and most definitely at Cahama and Ondjiva. Alternatively, mobile generators will be used.

2.6.5 Waste Management

There will be solid waste generated for the duration of the Project's construction activities and will comprise of general and hazardous waste components. General waste components

will comprise packaging material (i.e., paper, cardboard, plastic and wooden pallets), building rubble (i.e., bricks, wood and concrete), domestic waste and organic waste (i.e., food waste, vegetation cleared from site). Hazardous materials used on site will include fuels, oils and lubricants. Minimal waste is expected to be generated during the operational phase. A Waste Management Plan for the construction phase will be developed.

2.6.6 Personnel

Throughout the construction phase, the Project will require skilled labour (such as engineers, technicians, surveyors, etc.) and unskilled labour (mainly labourers).

Employment opportunities are not expected for the operational phase as maintenance activities are generally undertaken by a dedicated team of technicians from RNT and do not require any permanent staff to be on-site.

2.7 Project Timeline

2.7.1 Construction

It is expected that the construction phase will take 24-30 months to complete. Work will not necessarily be undertaken in a linear sequence as most of the activities can happen concurrently and in parallel, depending on the phasing of construction.

2.7.2 Life of the Project

The proposed infrastructure is expected to have a lifetime of at least 40 years.

3.0 Project Alternatives

3.1 Overview

An assessment of alternatives is considered a key step of the ESIA process under good international industry practice, including the International Finance Corporation's (IFC) Performance Standard (PS) 1 as well as the World Bank Environmental and Social Standard (ESS) 1⁸ which calls for "*an examination of technically and financially feasible alternatives to the source of such impacts, and documentation of the rationale for selecting the particular course of action proposed.*"

An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity which may include alternatives to:

- the location where the activity is proposed;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

The purpose of the alternatives analysis is to improve decisions on project design, construction, and operation based on feasible alternatives to the proposed project. This analysis may facilitate the consideration of E&S criteria at the early stages of development and decision-making based on the differences between real choices.

This Section will describe the alternatives under consideration, for further assessment in the ESIA study.

3.2 Site / Route Alternatives

A preferred corridor was selected through an Analytic Hierarchy Process (AHP) which is a multi-criteria decision-making (MCDM) approach with the objective to compare alternatives relative to specified criteria. The process provides subjective opinion into an objective model matrix of preference. The Engineering Consultant (Zutari) analysed the Project area and defined three potential corridors for each of the two-line corridors, i.e., Cahama to Xangongo and Xangongo to Ondjiva (Figure 3-1). This process used previous experience, topography, roads and presence of local populations and other economic activities as reference.

As illustrated in Figure 3-1, three routes were considered per line as follows:

- **Cahama – Xangongo** - Three options considered reference option (Option 1) which runs along the EN110 between Cahama and Xangongo with Option 2 north along the road and Option 3 further south from the main road.
- **Xangongo – Ondjiva** – Three options considered reference option (Option 1) runs along the EN110 between Xangongo and Ondjiva with Option 2 along Option 1 for approximately 30 km and then turns south-east, in a straight line towards Ondjiva and Option 3 being an almost straight line from Xangongo to Ondjiva, south of the reference option.

⁸ Guidance notes for borrowers: ESS1: Assessment and Management of Environmental and Social Risks and Impact.
<https://documents1.worldbank.org/curated/en/142691530216729197/ESF-Guidance-Note-1-Assessment-and-Management-of-Environmental-and-Social-Risks-and-Impacts-English.pdf>

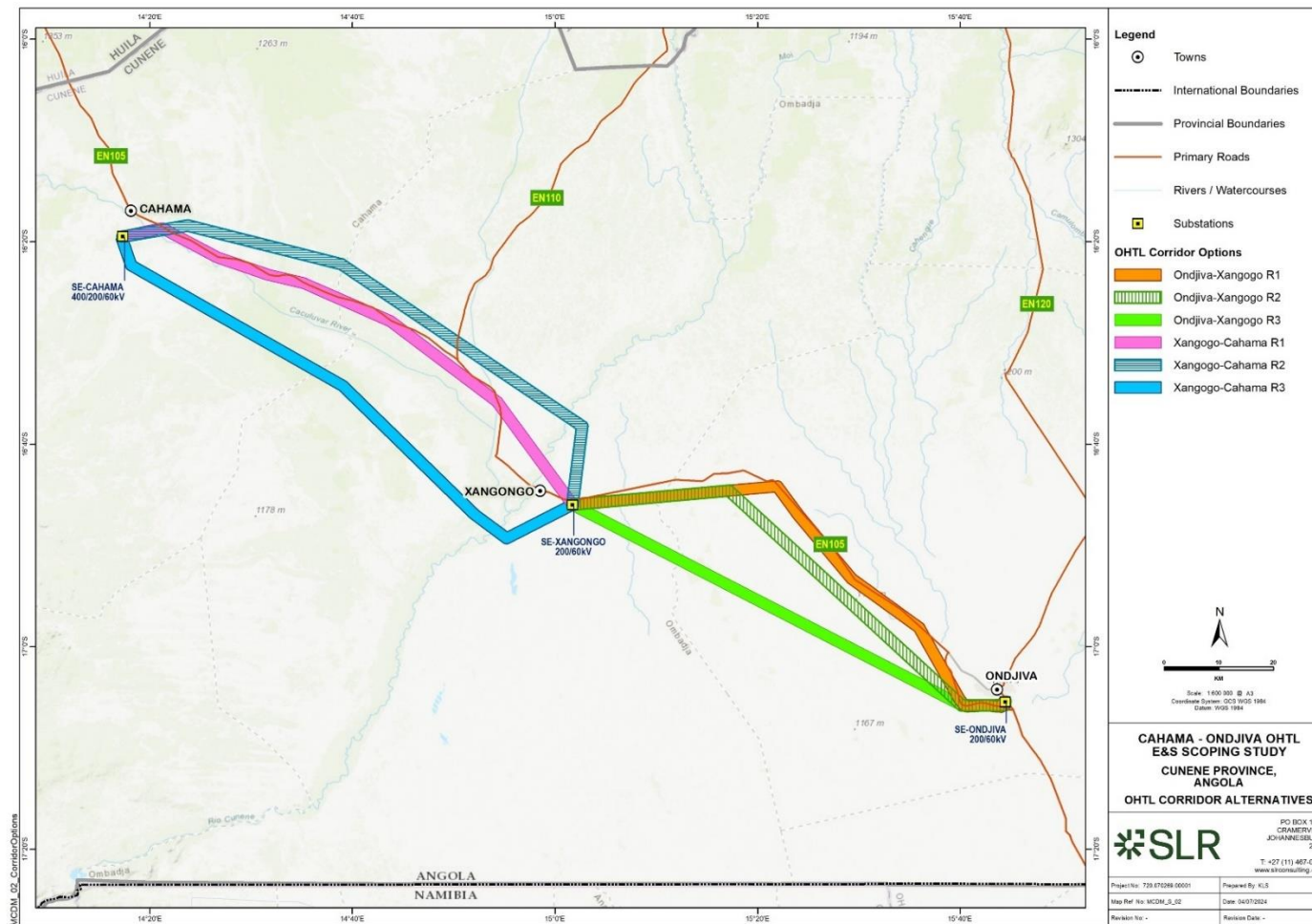


Figure 3-1: Corridor Route Options

Following the identification of the route options, a MCDM process was undertaken which can be summarised as follows (Figure 3-2).

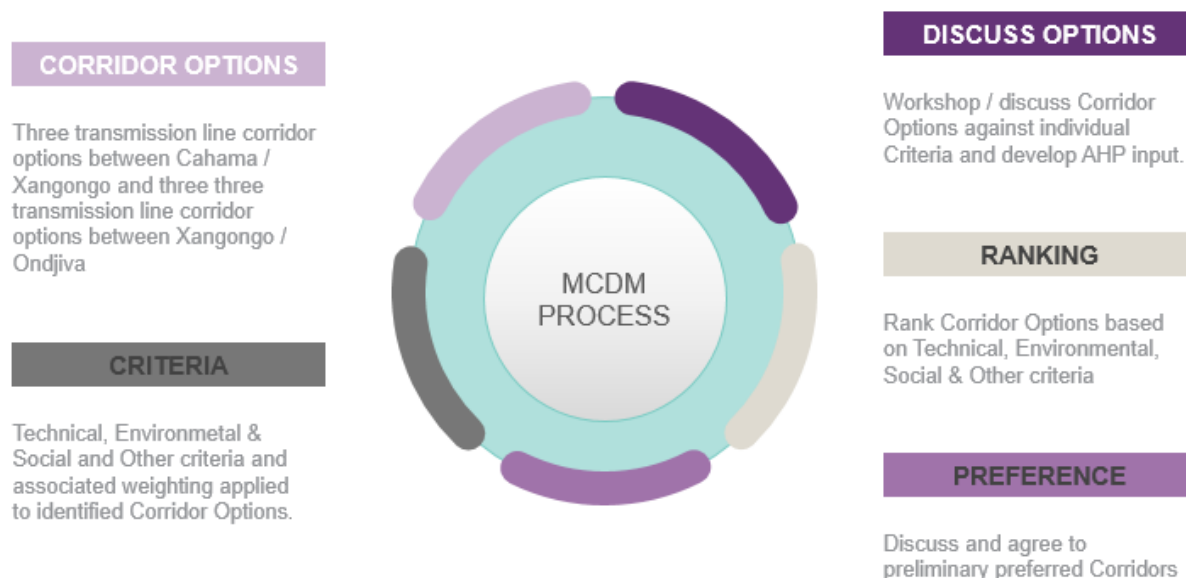


Figure 3-2: Summary of the MCDM Process Undertaken

A workshop was held with RNT on 1 July 2024 to apply the MCDM. The criteria used for the selection were as follows:

- **Technical**
 - River crossings
 - Length / turn tower / cost
 - Access for construction and maintenance
 - Geotechnical considerations
- **Environmental and social**
 - Critically Endangered and Endangered species
 - Presence of Natural Habitat
 - Proximity to wetlands and watercourses
 - Presence of dense settlement
 - Presence of croplands
- **Strategic / Other**
 - Presence of airports
 - Landmines

The intention of the route selection workshop was to identify site sensitivities and any potentially significant E&S risks that could pose a challenge to the permitting processes at the earliest opportunity. Additionally, it sought to determine the most technically viable and cost-effective route.

The route selection process was led by the Engineering team (Zutari), in collaboration with a multi-disciplinary team comprising representatives from RNT as well as biodiversity and social specialists from the SLR team, to ensure that all relevant information, local knowledge and transmission expertise was considered in the corridor selection; and that key Project stakeholders agreed on the way forward.

The route segments were rated against the environmental, social and technical criteria. In all instances, this was done on a one-to-one basis. This process was repeated until all line segments had been compared against one another. Corridor Option 3 was marginally preferred over Option 2 from a technical and strategic perspective. But further comparison

This scoring system allowed the team to evaluate each segment's alignment with the established criteria comprehensively, ensuring that the chosen route would be optimal in terms of technical feasibility, cost efficiency, and minimal environmental and social impact.

The preferred corridor selected is presented in Figure 3-3.

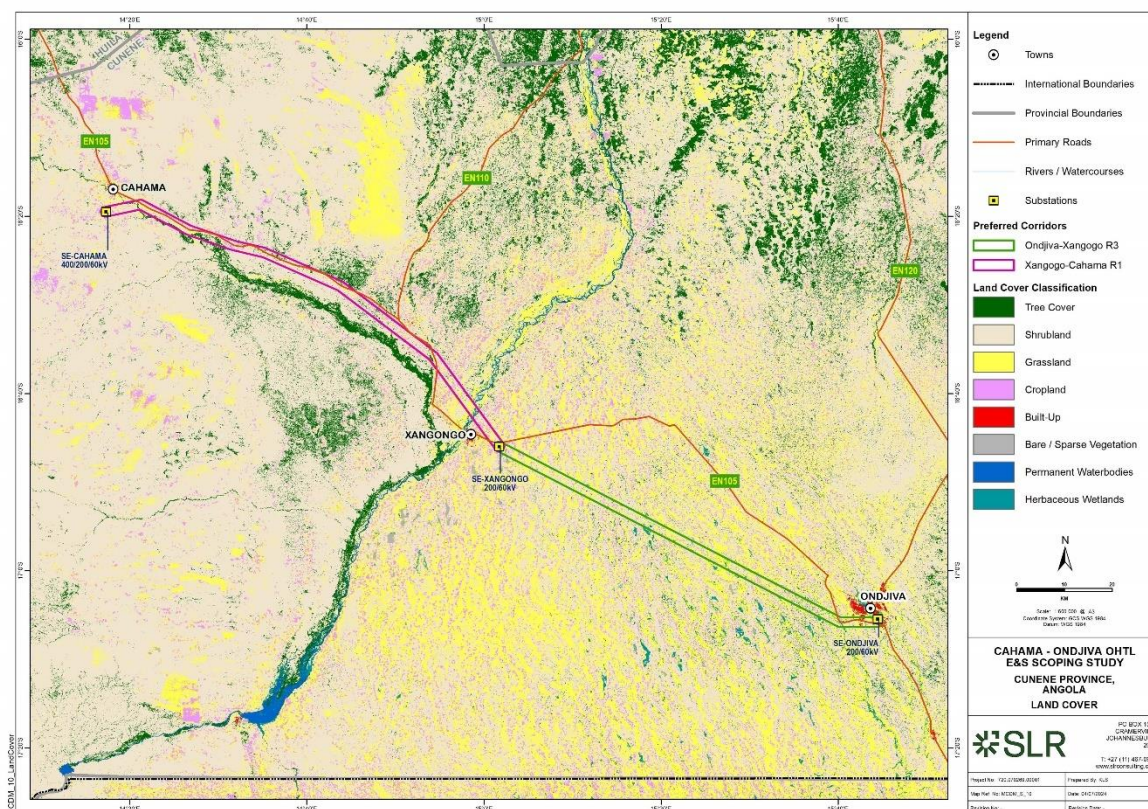


Figure 3-3: Preferred Corridor Selected

3.3 Design Alternatives

It is not foreseen that not any viable technology alternatives will be considered. The cost of underground cables versus overhead lines is just considered too high and the application of underground cables is reserved for urban areas where no line servitudes can be obtained.

3.4 Technology Alternatives

OHTLs employ a variety of structures to support the conductors and insulators. These structures must be sturdy, reliable, and able to withstand harsh weather conditions. The choice of structure depends on factors such as the voltage of the transmission line, the span between towers, and the terrain. Possible alternative technologies of structures are presented in Table 3-1 and Figure 3-4.

The type of structure is dependent on technical considerations and will be assessed further in the ESIA.

Table 3-1: Possible Alternative Technologies for Structures

Structure Type	Description	Advantages	Disadvantages
Poles	Typically used for lower voltage lines	Inexpensive, easy to install	Not as tall as towers, not suitable for longer spans or higher voltages
H-frame towers	Commonly used for medium voltage lines	Relatively strong, can support longer spans than poles	Not as tall or as strong as lattice towers
Lattice towers	Most common type for high voltage lines	Strongest and tallest type of structure, can support long spans and high voltages	Complex design, more expensive than poles or H-frame towers
Self-supporting towers	Newer type, becoming increasingly popular	More aesthetic than traditional lattice towers, can be used in areas where guy wires are not allowed	More expensive than traditional lattice towers
Guyed towers	Used in areas where self-supporting towers are not possible	Less expensive than self-supporting towers	More susceptible to damage from wind and ice

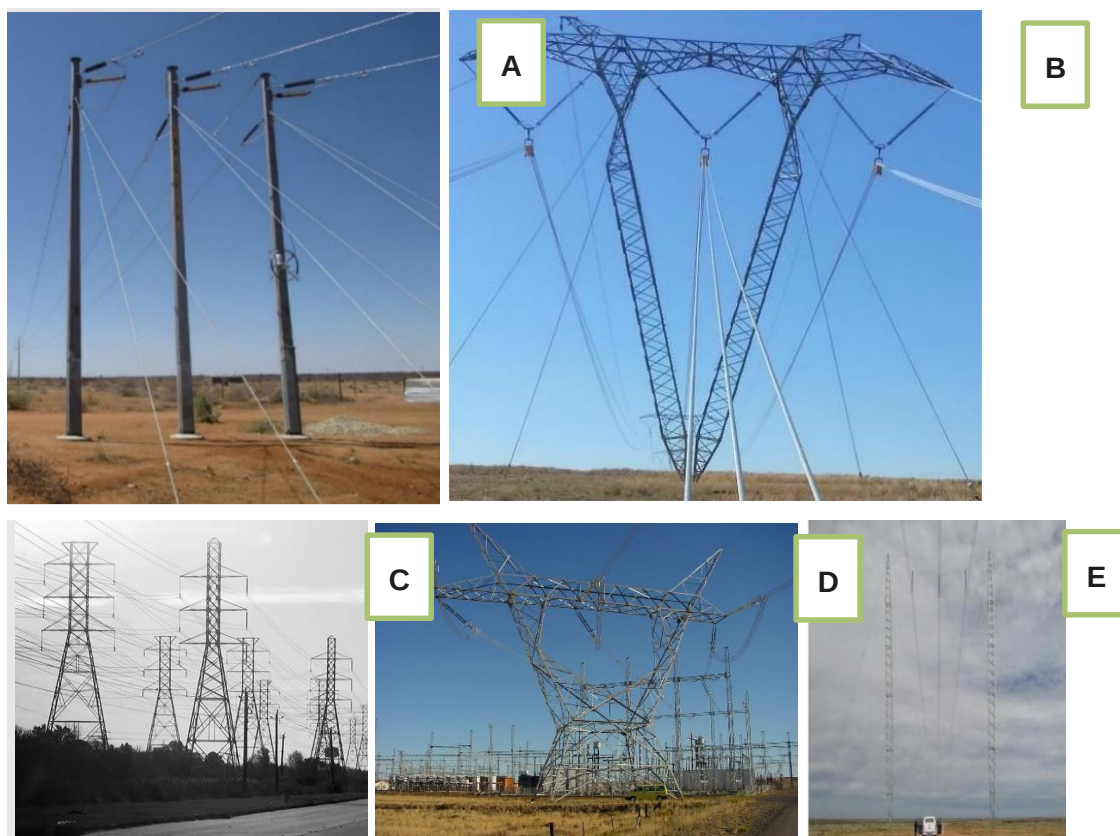


Figure 3-4: Typical Monopole Type Structure (A), H-Frame Type Structure (B), Lattice Type Structure (C), Self-Supporting Type Structure (D) and Guyed Type Structure (E)

3.5 No-Project Alternative

The 'No-Project' alternative is the option of not CTS and associated infrastructure and where the status quo would prevail. This alternative would result in no additional impact on the receiving environment. However, the benefits of the Project will also not be realised.

Angola is a country struggling to meet its energy demand. With an increasing demand in energy predicted and growing environmental concerns about fossil fuel-based energy systems, the development of large-scale renewable energy supply schemes is strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports in the country. Additionally, the Country is also committed to reducing greenhouse gas (GHG) emissions by up to 35% by 2030 in the fight against climate change⁹

Should the status quo persist, GHG emissions will prevail as energy will continue to be sought through non-renewable sources due to a lack of grid connection infrastructure to evacuate power generated from renewable energy facilities.

In the case of the GoA, should the 'No-Go' alternative be considered, the County's strategic vision to transform the transmission network to support renewable energy initiatives will also not be realised.

Therefore, the No-Project option is not considered as a suitable option on this Project.

⁹ Green Clime Fund (2024). *Enhancing Angola's Access to Climate Finance for Sustainable Transport and Sustainable Landscape (AFOLU) Sectors*.

4.0 Policy and Legal Framework

4.1 Overview

This Section outlines the key legislative requirements and guiding principles underpinning the ESIA process. The legal and regulatory framework provides the various legal aspects that must be adhered to during the Project life cycle (design, implementation / construction, operation and later when it is decommissioned and closure). The legislation detailed is only applicable at the time of drafting this document.

4.2 Key National Acts, Laws and Policies

In order to protect the environment and ensure that the development is undertaken in an environmentally and socially responsible manner, there are a number of significant E&S related legislation that need to be taken into account during this study. The overarching legislation applicable in Angola is the Environmental Framework Law (Law No. 5/98, of 19 June) and associated Environmental Impact Assessment (EIA) Regulations.

Table 4-1: Key National Acts, Plans and Policies Considered

Acts / Plans / Policies	Description and Relevance
Acts and Legislation	
The Constitution of the Republic of Angola (Lei Constitucional da República de Angola, 2010)	The Environmental component: provides the basis for the Environment Framework Law through two articles: Article 21 determines the State's fundamental responsibilities, including the promotion of the harmonious and sustainable development of all national territory, protecting the environment, the natural resources and the historical, cultural and artistic national heritage. Article 39 on Environmental Rights states that all citizens have the right to live in a healthy and unpolluted environment, as well as the duty to defend and preserve it. The State will take the necessary measures to protect the environment and national species of flora and fauna throughout the national territory, to maintain the ecological balance, ensure the correct location of economic activities and the exploitation and rational use of all natural resources, within the framework of sustainable development and respect for the rights of future generations and the preservation of different species. The law punishes acts that endanger or injure the preservation of the environment. The Social component: article 21 of the Angolan Constitution states that the State's fundamental responsibilities includes the promotion of the well-being, social solidarity and improving the quality of life of the Angolan people, especially of the most disadvantaged population groups. Complementary article 37, on rights of property, requisition and expropriation, states that expropriation can only be allowed for public utility, by means of fair and prompt compensation, under the terms of the Constitution and the law. The payment of this compensation is a condition for effective expropriation.
Land Law (Law No. 09/04)	The Law states that all land in Angola is considered the property of the state with individuals, communities, and organizations able to acquire rights to use land through concessions, leases, or customary land tenure systems. The Law mandates the registration and titling of land to secure tenure and protect the rights of land users. It recognises various forms of land tenure, including customary rights, and encourages their formalisation through registration to provide greater security and legal recognition to customary landowners. Expropriation for public utility purposes, such as infrastructure development is permitted, but requires fair compensation be given to affected land users, who hold land use rights. The law outlines the expropriation process, including notification, land and improvement valuation, and the right to appeal decisions. Overall, the Land Law aims to balance state interests in land development with the protection of individual and communal land rights, fostering orderly land use and development while ensuring that expropriated landowners receive fair compensation and encouraging the formalisation of land rights for enhanced legal security.

Acts / Plans / Policies	Description and Relevance
Environmental Framework Law (Law No. 5/98)	The Law defines the framework for all environmental legislation and regulations in Angola and provides the definitions of key concepts including protection, preservation and conservation of the environment, the promotion of quality of life and the use of natural resources. This Law incorporates key international sustainable development declarations and agendas (e.g., Agenda 21 and the National Environmental Management Programme), and establishes citizens' rights and responsibilities. Article 14 allows for the establishment of environmental protection areas and the setting of rules for those areas, including the identification of activities that are prohibited or permitted in the protected areas and their surroundings. Article 16 of the Law provides for environmental impact assessments (EIAs) to be undertaken for all activities that may have an impact on the balance and wellbeing of the environment and society. Clause 2 of this Article states that more specific legislation on EIAs will be developed by the Government. Article 17 deals with the need for environmental licensing and Article 18 refers to environmental auditing.
Presidential Decree No. 117/20 of April 22nd, 2020, on the Environmental Impact Assessment (EIA) Regulation and Environmental Licensing Procedure	Presidential Decree No. 117/20 requires an EIA for all public or private projects mentioned in the Annexes of the Presidential Decree, except for projects the government deems to be of vital interest to national defense or national security. This decree includes several activities related to the development of the EIA process. This Presidential Decree outlines the following: • The mandatory project registration procedure using the Integrated Environment System (<i>Sistema Integrado do Ambiente – SIA</i>) – an online platform created by the Presidential Decree No. 117/20 of April 22nd, 2020 (Article 6). • The categorisation of projects to be licensed (Article 7) and which are listed in annexes I, II, III, IV and V of the Decree. According to the Angolan legislation there are four categories of projects: • Category A: listed in Annex I and are subject to an EIA process and supervision by independent expert reviewers with proven experience. • Category B: projects whose activities are included in Annex II and are subject to an EIA process. • Category C: whose activities are listed in Annex III and are subject to a Simplified Environmental Study. • Category D: activities listed in Annex IV and are not subject to the EIA process and to Environmental Licensing. Presidential Decree No. 117/20 specifies the activities that are required during the EIA process (Articles 6 and 7) as well as the contents of the EIA (Article 9). This phase includes the following steps: • Undertaking field visits to obtain primary environmental and social baseline data. • Engaging relevant stakeholders (both regulators and public) through formal and informal meetings. • Public consultation happens after the EIA has been submitted and it is organized by MINAMB. • Reviewing all applicable legislation relevant to the project and providing an overview on the permitting process. • Preparing a comprehensive description of all stages of the project. • Developing an adequate environmental and social management plan. • Developing any additional documentation required by the MINAMB and the line Ministry (MINEA) such as, but not limited to, waste management plan and stakeholder engagement plan.
Executive Degree on the Regulation on the Technical Registration for Environmental Consulting	The Regulation on the Technical Registration for Environmental Consulting Societies / Companies states that: • Article 10: companies need to register to be able to submit EIAs for approval and perform environmental audits. The request for registration is made to

Acts / Plans / Policies	Description and Relevance
Societies/Companies (Degree No. 86/12)	MINAMB, which issues an Environmental Consultant Certificate, which is valid for 1 year and needs to be renewed annually; • Article 12: Only the EIAs submitted by entities with a valid certificate can be accepted and assessed; • Article 14: list of all registered environmental consultants must be available to be consulted by interested parties; • Article 15: Foreigners can be recruited by the registered consultants as long as the Angolan labour laws are respected; • Article 16: The Consultant that compiled the EIA for a project should not be responsible for the environmental audit of that activity.
Decree on the Regulation on the Classification of Environmental Consulting and Auditing Societies/ Companies (Decree No. 302/2016)	The Decree on the Regulation on the Classification of Environmental Consulting and Auditing Societies/ Companies states that environmental companies are classified as big, medium or small. A big company is deemed to have the technical capability to compile EIAs and Environmental Audits for projects with investment equivalent or superior to USD 10 000 000.00 (ten million US Dollars) and should employ at least seven senior technicians in different areas of environmental expertise able to develop an EIA or an Environmental Audit. A medium company is deemed to have the technical capability for projects between USD 5 000 000.00 (five million US Dollars) and USD 10 000 000.00 (ten million US Dollars) and should include at least five senior technicians able to develop the required work. Finally, a small enterprise is deemed to have the technical capacity to develop an EIA or Environmental Audit for projects between 1 000 000.00 (one million US Dollars) and never 5 000 000.00 (five million US Dollars) and should include at least three senior environmental technicians. This classification is confirmed with the renovation of the Company's Environmental Registry.
The Executive Decree on the Terms of Reference (ToR) for the Environmental Impact Assessment Report/ Study (Executive Decree No. 92/12)	The Decree provides the templates for the application forms, the simplified description of the project characteristics, and the generic minimum requirements for the EIA report structure. Due to this decree, some projects are subject to specific EIA ToRs (e.g., mining, oil and gas, industrial landfill or roads), released by MINAMB as a collection of booklets that provide guidance on the requirements for the impact assessment of these activities. There is no specific EIA ToR for Transmission Lines or any kind of electrical linear infrastructure, so the generic guidance set in this Executive Decree will be followed in the assessment of the CTS.
The Executive Decree on the Regulations for Public Consultation for Projects subjected to the EIA Process (Executive Decree No. 87/12)	The Executive Decree on the Regulations for Public Consultation for Projects subjected to the EIA Process notes that DNPAIA is the entity responsible for the EIA's public participation, after the EIA report has been submitted to the authorities for evaluation. The objectives of these regulations include: • Article 3: ensuring that the project information is released to the public and the collection of public opinion on all relevant aspects of the project activities; • Article 4: public consultation is made through a session with the presence of a panel composed by a chairperson, who represents the DNPAIA, a secretary and a rapporteur, who will be responsible to conduct, register and document the public session; • Article 7: The disclosure of the public session is MINAMB's responsibility. Terms and documentation, namely the Non-Technical Summary, to be released for this session are explained in Article 8; • Article 9: The timeframes for the public consultation can't be less than five days or more than 10 days; • Article 11: Public participation in the session can be verbal or written; • Article 12: all the questions raised need to be addressed orally in the public session; • Article 13: The minutes of the public session are prepared by the secretary, reviewed and approved by the chairperson and rapporteur and serve as basis for the technical advice for the EL process; • Article 16: The project's proponent is responsible for all costs associated with the public consultation.

Acts / Plans / Policies	Description and Relevance
Territorial and Urban Planning Law (Law No. 3/04 of 24 June)	The Law on Territorial and Urban Planning provides a framework for the organization, use, and management of land to promote sustainable urban and rural development. It establishes guidelines for territorial planning, zoning, and land use with the intention of ensuring balanced regional development, environmental protection, and improved living conditions. The Law mandates public participation in planning processes. The law allows for expropriation of land for public utility purposes, provided that it follows due process and ensures fair compensation to affected landowners.
National Policy for Land Concession Rights (Presidential Decree No. 2016/11 of 8 August)	The Policy specifies the general basis of the National Policy for Land Concession Rights, defining the mechanisms for accessing, using and exploiting land within Angola. It defines the following land uses, based on their main economic activity: agricultural, urban, mining and tourism, and defines the rules to establish such categories of land use. It also sets out that for public infrastructure, the land concession should consider, and protect, areas for their future expansion, as well as for maintenance and potential future developments. It further creates the Inter-ministerial Commission, whose objective it is to promote the registration of Rural Land in favour of Local Communities. The Commission is responsible for surveying these lands, analysing their use and promoting the granting of land rights. It aims to survey rural or community land in rural communities; analyse the effective use of rural lands; promote the rapid recognition and registration of community-owned land and buildings under the customary domain; promote the granting of land rights to land parcels' holders that meet the legal requirements; create conditions so that the competent institutions can continue work after the term of validity of the Inter-ministerial Commission; etc.
General Regulation for Land Concession (Decree No. 58/07 of 13 July)	The Decree approves the General Regulation for Land Concession in Angola. This decree establishes the basic framework for ownership, concession and use of agricultural land in Angola. It consists of seven chapters which define all the issues related to land legislation, such as general provisions, land classification, licensing, transmission and rescission of land use rights, registration, and administration powers.
Regulation of Rehousing Operations (Presidential Decree No. 117/16 of 30 May)	The Decree defines the regulations for the relocation and rehousing of families living in high density areas, in informal and precarious settlements, with the objective of providing them with better living conditions and, at the same time, make use of the areas for public purposes. This decree is applicable to areas affected by natural disasters, urban requalification, displacement of families due to public infrastructure, and distribution of housing to enhance the living conditions of the population. It defines the procedures for these relocation operations, setting out the generic stages and approaches to be followed until the authority/entity that has responsibilities over an area has started the works for the infrastructure that was the basis for the rehousing. Should the construction works not commence within 180 days, the land rights of the area revert to the Municipal Authorities.
Implementation of Norms on the Resettlement of Displaced Populations (Presidential Decree No. 79/02 of 6 December)	The Decree is mostly applicable to displaced persons, who are defined as "persons or groups of persons who have been forced or obliged to leave their homes or places of habitual residence, particularly as a result of violence, or in order to avoid the results of armed conflict, violations of human rights or natural or man-made disasters, and who have not crossed an internationally recognised State border;". However, it provides valuable steps to be considered when people are resettled. These steps should be considered in the preparation of a Resettlement Action Plan (RAP) and the implementation thereof, as they sensitise the implementing agencies to the circumstances of Angolan citizens, post-war. The following entities lead the resettlement and return of displaced persons, and should be regarded as stakeholders in this project and engaged with in the event of resettlement being required: • CNRSPDD - National Commission for Social and Productive Reintegration of Demobilised Personnel and Displaced Populations; • CP – Provincial Commission (reporting to the CNRSPDD); and • GADH – Ad Hoc Group for Technical and Administrative Support (reporting to the CNRSPDD).

Acts / Plans / Policies	Description and Relevance
	The various roles, responsibilities, and competencies of these implementers are set out in Article 5 and 7 of the decree. It provides that the applicable Provincial Government shall provide resettled persons with “Resettlement Kits”, such as seeds, agri-tools and training on the use thereof, an assessment of the area to be used for agriculture (if it is the need of the resident community), kitchen sets, hygiene materials, medical kits, building tools, shelter and clothing. Furthermore, it States that it is the responsibility of the Provincial Government to evaluate and construct, or rehabilitate, infrastructure that has been affected in the resident community. It provides requirements for the location of healthcare units (healthcare posts, mobile clinics, hospitals, etc.) and schools for a predetermined number of people. The abovementioned requirements indicate that the people to be resettled might be deprived of infrastructure in their local area, or, if they have already been resettled by the Provincial Government, they might be resistant towards further resettlement. The Norms on the Resettlement of Displaced Populations, Decree no. 01/01, of 5 January, provides for the conditions of Provincial Governments working in concert with Provincial humanitarian co-ordination groups and NGOs to assist displaced persons during resettlement. In Article 4 a), it states that “<i>All resettlement and return sites must be verified as free of mines</i>”.
Other Policies	
Angola 2050: Long-Term Strategy	The Angola 2050: Long-Term Strategy outlines the country's vision for sustainable development, focusing on economic diversification, social inclusion, and environmental sustainability. In the energy sector, the strategy aims to significantly increase electricity access and generation capacity. The energy sector is essential to increase economic participation and productivity, so in order to meet the needs of the growing population and enable economic growth. The plan aims at increasing on-grid electrification from 42 percent of households in 2021 to over 70 percent by 2050 and promote off-grid solutions in the rest of the country. In addition, there will be an increase on the contribution of renewable energy to electricity supply to over 90 percent of the total by 2050, thereby taking advantage of a lower cost per unit from these sources (mainly hydropower and solar).
Associated Legislation with Potential Influence on the Development	
Environment	- Decree No. 1/10, of 13 January, on Environmental Auditing - Presidential Decree No. 194/11, of 7 July, on Environmental Damage Liability - Presidential Decree No. 83/22 of 12 April, Taxes for Emission and Renewal of Environmental Licenses
Energy	- Law No.14-A/96, of 31 May, amended by Law no. 27/15, of 14 December, General Law on Electricity - Decree No. 47/01, of 20 July, Regulations for Energy Production - Decree No. 41/04 of 2 July, Regulation of Licensing of Installations of Production, Transport and Distribution of Energy - Presidential Decree No. 256/11, of 29 September, approving the National Policy and Strategy for Energy Security - Presidential Decree No. 76/21 of 5 March, Regulation on Electricity Generation, Transmission, Distribution and Supply.
Land Use	- Law No. 3/04, of 25 June, Law on Territorial and Urban planning - Law No. 9/04, of 9 November, Land Law - Decree No. 2/06, of 23 January, General regulation on the Territorial, urbanistic and rural plans (REPTUR) - Presidential Decree No. 216/11, of 8 August, National Policy for Land Concession Rights - Law No. 1/11, of 14 January, Basic General Regime of the National Planning System - Presidential Decree No. 214/15, of 08 December, approving the National Strategic Plan for Territorial Management 2015-2025
Water	Law No. 6/02, of 21 June, Water Law

Acts / Plans / Policies	Description and Relevance
	• Presidential Decree No. 261/11, of 6 October, Regulation on Water Quality • Presidential Decree No. 141/12, of 21 June, Regulation for the prevention and control of pollution in national waters • National Health Development Plan 2012-2025 • Presidential Decree No. 9/13, of 31 January, approving the National Water Strategic Programme for the period 2013-2017 • Presidential Decree No. 82/14, of 21 April, Regulation of General Use of Water Resources • Presidential Decree No. 126/17, of 13 June, National Water Plan
Waste Management	• Presidential Decree No. 190/12, of 24 August, Regulation on Waste Management • Executive Decree No. 17/13, of 22 January, on the waste management of residues resulting from building and demolition activities
Flora, Fauna and Conservation Areas	• Resolution No. 1/10, of 14 January, National Policy on Forests, Wildlife and Conservation areas • Presidential Decree No. 46/14, of 25 February, approving the National Action Programme to fight Desertification • Resolution No. 27/16, of 22 July, implementing the Convention on Wetlands • Executive Decree No. 433/16, of 26 October, validating the Certificate of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) • Law No. 6/17, of 24 January, Forest and Wildlife Law • Executive Decree No. 252/18, of 13 July, approves the Red List of Species for Angola • Presidential Decree No. 171/18, of 23 July, Forestry Regulation • Presidential Decree No. 26/20 of 6 February 6, National Biodiversity Strategy and Action Plan (2019-2025) • Law No. 8/20 of 16 April, on Environmental Conservation Areas • Presidential Decree No. 50/24 of 2 February, on Regulation 5of Environmental Conservation Areas
Heritage	• Law No. 14/05, of 7 October, Cultural Heritage Law • Decree No. 2/06, of 23 January, on the Architectural and Archaeological Heritage
Labour	• Law No. 12/23 of 27 December, General Labour Law
Socio-economic/ Protection of Vulnerable Groups	• Resolution No. 9/04, of 4 June, National Strategy for Combating Poverty • Presidential Decree No. 222/13, of 24 December, on the National Policy for Gender Equality and Equity • Law No. 25/12, of 22 August, Child Protection and Integral Development Framework Law • Presidential Decree No. 158/18, of 29 June, approves the National Development Plan 2018-2022

4.3 Regional Policies and Agreements

In addition to National legislation, there are a number of regional policies and agreements which must be considered as described in Table 4-2.

Table 4-2: Regional Policies and Agreements

Acts / Plans / Policies	Description and Relevance
Acts and Legislation	

Acts / Plans / Policies	Description and Relevance
Southern African Power Pool (SAPP) Policy	The SAPP is a regional body that optimises the use of available energy resources in the region, allowing countries to support each other during emergencies. The primary aim of SAPP is to provide a reliable and economical electricity supply to the consumers of each of the sixteen SAPP utilities and Independent Power Producers, consistent with the reasonable utilisation of natural resources and effects on the environment, and a stable interconnected electrical system. The Power Pool consists of 12 SADC member countries represented by their respective power utilities (see Figure 4-1) EIA Guidelines for Transmission Infrastructure The SAPP has developed the Environmental and Social Impact Assessment Guidelines for Transmission Infrastructure as a tool to assist in completing an ESIA (SAPP, 2010). The Guidelines also assist to meet the environmental and social requirements of the host country and the finance institutions and take into consideration the transboundary nature of SAPP projects. The document provides guidance on, inter alia, project screening, recommended format and components of an ESIA report and ESMP, approach to public participation, identification of impacts, mitigation measures and monitoring. Environmental and Social Management Framework The SAPP has also developed an Environmental and Social Management Framework (ESMF - SAPP, 2018b) which serves as a reference manual to assist in the high-level environmental and social screening of projects in order to strengthen the assessment and management of risks and impacts. The ESMF is particularly relevant where project loans are required from international financial institutions, such as the World Bank that apply policies, standards and guidelines to safeguard environmental and social sustainability. Of relevance to the current project phase, the following tools have or will be consulted: • Generic stakeholder engagement process for scoping; • Specialist terms of reference; • Generic impact rating methodology¹⁰; • Typical risks, impacts and mitigation measures associated with energy generation and transmission projects; and • Generic ESMPs.

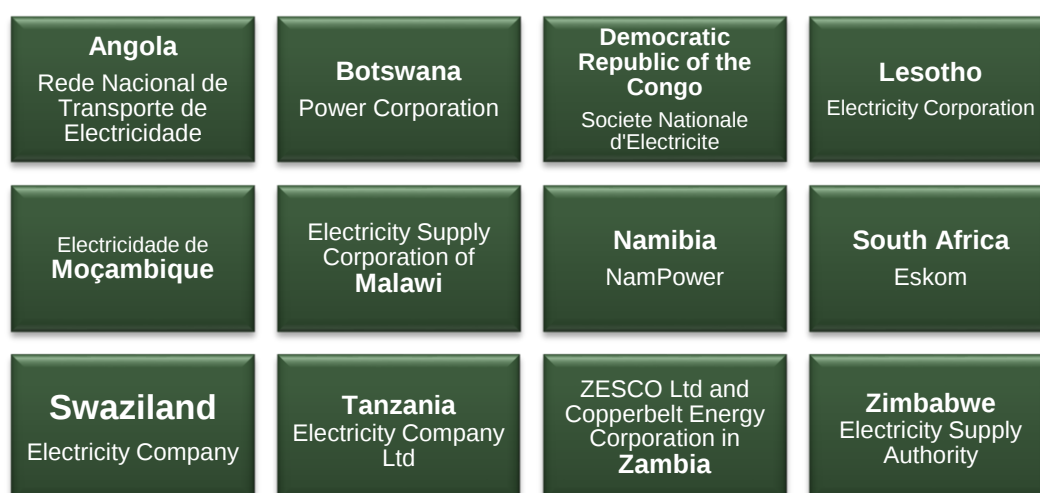


Figure 4-1: Members of the SADC Power Pool Policy

¹⁰ Although it is noted that the impact methodology prescribed by in-country environmental legislation and/or funding institution will need to be applied.

4.4 International Conventions, Standards, Guidelines and Practises

Acts / Plans / Policies	Description and Relevance
Lender Standards	
WBG E&S Standards	The WBG ESS are part of the World Bank's Environmental and Social Framework (ESF). These standards are designed to help borrowers manage the risks and impacts of projects funded by the World Bank. There is ten ESS which cover the following areas: • ESS 1: Assessment and Management of Environmental and Social Risks and Impacts • ESS2: Labor and Working Conditions • ESS3: Resource Efficiency and Pollution Prevention and Management • ESS4: Community Health and Safety • ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement • ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources • ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities • ESS8: Cultural Heritage • ESS9: Financial Intermediaries • ESS10: Stakeholder Engagement and Information Disclosure Of these, ESS 1 requires borrowers to assess, manage, and monitor environmental and social risks and impacts associated with projects to ensure they are sustainable and socially inclusive. ESS 2 through to 9 establish objectives and requirements to avoid, minimise, and where residual impacts remain, to compensate / offset for risks and impacts to workers, affected communities, and the environment. ESS 10 emphasises the importance of engaging with stakeholders, including affected communities, throughout the project lifecycle and ensuring transparent information disclosure.
IFC Performance Standards for E&S Sustainability	The IFC Performance Standards are applied to a project to manage E&S risks and impacts throughout the life of an investment. There are eight performance standards which cover the following areas: • PS 1: Assessment and Management of environmental and social Risks and Impacts; • PS 2: Labour and Working Conditions; • PS 3: Resource Efficiency and Pollution Prevention; • PS 4: Community Health, Safety, and Security; • PS 5: Land Acquisition and Involuntary Resettlement; • PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • PS 7: Indigenous Peoples; and • PS 8: Cultural Heritage. Of these, PS 1 establishes the importance of: • Undertaking an integrated approach to identifying the E&S impacts, risks, and opportunities of projects; • Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and • Effective management of E&S performance throughout the life of the project.

Acts / Plans / Policies	Description and Relevance
	PS 2 through to 8 establish objectives and requirements to avoid, minimise, and where residual impacts remain, to compensate / offset for risks and impacts to workers, affected communities, and the environment. The IFC applies the Performance Standard on E&S sustainability to manage E&S risks and impacts to enhance development opportunities in its private sector financing in its member countries eligible for financing. The Performance Standard may also be applied by other financial institutions electing to apply them to projects in emerging markets.
Guidelines	
IFC General Environmental Health and Safety (EHS) Guidelines (2007)	• Environmental (Air Emissions and Ambient Air Quality; Energy Conservation; Wastewater and Ambient Water Quality; Water Conservation; Waste Management; Noise and Contaminated Land) • Occupational Health and Safety (General Facility Design and Operation; Communication and Training; Physical Hazards; Chemical Hazards; Personal Protective Equipment; Special Hazard Environmental and Monitoring) • Community Health and Safety (Water Quality and Availability; Structural Safety of Project Infrastructure; Life and Fire Safety; Traffic Safety; Transport of Hazardous Materials; Disease Prevention and Emergency Preparedness and Response) • Construction and Decommissioning (Environment; Occupational Health and Safety and Community Health and Safety) • Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labour Influx; • Industry Sector Guidelines: The EHS Guidelines are technical reference documents with general and industry-specific examples of GIIP as defined in IFC's Performance Standards applicable to this project: ◦ EHS General Guidelines (2007); ◦ EHS Guidelines for Electric Power Transmission and Distribution (2007); and ◦ EHS Guidelines for Construction Materials Extraction (2007).
Policies	
Organisation for Economic Co-operation and Development (OECD) Recommendation of the Council on Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence (the "OECD Common Approaches") (2016)	The OECD "Common Approaches" was adopted on 28 June 2012 and revised by the OECD Council on 6 April 2016 (OECD/LEGAL/0393). This agreement sets common approaches for undertaking environmental and social due diligence to identify, consider and address the potential environmental and social impacts and risks relating to applications for officially supported export credits as an integral part of Members' decision-making and risk management systems. While an OECD Recommendation is not legally binding, it expresses the common position or will of the whole OECD memberships, and therefore may entail important political commitment for Member governments.
Sustainable Development Goals (2015)	The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations (UN) Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs recognise that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability. Through the pledge to Leave No One Behind, countries have committed to fast-track progress for those furthest behind first. That is why the SDGs are designed to bring the world to several life-changing 'zeros', including zero poverty, hunger, HIV / AIDS and discrimination against women and girls. SDG 7 aims at achieving universal access to affordable, reliable, sustainable, and modern energy for all by 2030. Goal 7 targets include: • Ensure universal access to affordable, reliable, and modern energy services;

Acts / Plans / Policies	Description and Relevance
	• Increase substantially the share of renewable energy in the global energy mix; • Double the global rate of improvement in energy efficiency; • Enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology; and Expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.

Table 4-3: Other Guidelines and Conventions Applicable

Guideline / Convention / Agreement	Considerations
Guidelines	
Stakeholder Engagement	• IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (2007) • IFC Addressing Grievances from Project-Affected Communities (2007)
Resettlement	• IFC Handbook for Preparing a Resettlement Action Plan (2007) • United Nations (UN) Basic Principles and Guidelines on Development-based Evictions and Displacement (2007)
Human Rights	• UN Guidelines on Business and Human Rights (2011) • International Bill of Human Rights (1995)
Labour and Working Conditions	• International Labour Organisations (ILO's) Declaration on Fundamental Principles and Rights of Work (1998) • Occupational Health and Safety Convention (1979) • Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration (1977)
Standards and Limits	• World Health Organisation (WHO) ◦ Ambient Air Quality Standards; ◦ COVID-19 Guidelines; and ◦ Drinking Water Quality Standards. • The Commission on Non-Ionizing Radiation Protection (ICNIRP)
Conventions	
Biodiversity and Protected Areas	• International Plant Protection Convention (1951) • Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East (1965) • African Convention on the Conservation of Nature and Natural Resources (1968) • RAMSAR Convention on Wetlands (1971) • Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (1973) • Convention on the Conservation of Migratory Species of Wild Animals (1979) • Convention on Biological Diversity (1992) • UN Convention to Combat Desertification (26 December 1996) • New Partnership for Africa's Development (NEPAD) (2001)
Climate Change / Energy	• Vienna Convention on Protection of the Ozone Layer (1980) • Montreal Protocol (1987) • UN Framework Convention on Climate Change (1996) • UN Framework Convention on Climate Change - Kyoto Protocol (23 February 2005) • Paris Agreement adopted on 12 December 2015 at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC CoP21)
Air Quality	• Stockholm Convention on Persistent Organic Pollutants (POPs) (2004)

Guideline / Convention / Agreement	Considerations
Heritage Resources	• United Nations Educational, Scientific and Cultural Organisation (UNESCO) Convention for the Safeguarding of the Intangible Cultural Heritage • Convention concerning the Protection of the World Cultural and Natural Heritage (1972) (Paris) • UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (1972) • Convention on the Protection of World Cultural and Natural Heritage (1984)
Pollution Control / Waste Management	• The Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movements and Management of Hazardous Waste (1991) • Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1999) • Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (2004)

Table 4-4: Applicability of WBG ESS

No.	Performance Requirement	Expected Applicability	Description
ESS1	Assessment and Management of Environmental and Social Risks and Impacts: Requires borrowers to assess, manage, and monitor environmental and social risks and impacts associated with projects to ensure they are sustainable and socially inclusive.	Applicable	The E&S Scoping Study serves as the first step in the process of identifying E&S risks and further assessment is required in the following disciplines: biodiversity including Critical Habitat Assessment (CHA), hydrology; climate change, visual and socio-economic assessment.
ESS2	Labour and Working Conditions: Aims to promote fair treatment, non-discrimination, and equal opportunity for workers, as well as safe and healthy working conditions.	Applicable	Applicable during construction and operation, when local labour will be hired and, in the supply and subcontractor chain.
ESS3	Resource Efficiency and Pollution Prevention and Control: Focuses on the efficient use of resources such as energy, water, and raw materials and on the prevention and management of pollution.	Applicable	This is applicable during construction and operation and include aspects such as solid waste generation as well as minimisation and recycling, wastewater discharge quality and quantity, energy efficiency, air pollution / odours, noise generation, etc.
ESS4	Community Health, Safety and Security: Ensures that projects do not endanger the health, safety, and security of communities, taking into account infrastructure safety, hazardous materials, and emergency preparedness.	Applicable	Potential risks to the community include traffic incidents; noise generated during the construction and operation as well as electrocutions or occupational hazards.
ESS5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement: Requires that projects avoid or minimise land acquisition and involuntary resettlement. If land acquisition or involuntary resettlement is necessary, it must be carried out in a way that is fair and equitable, and that compensates affected people for their losses.	Applicable	The evidence in this E&S Scoping Report suggests that physical and economic displacement may be required.

No.	Performance Requirement	Expected Applicability	Description
ESS6	Biodiversity Conservation and Sustainable Management of Living Natural Resources: Requires that projects avoid or minimise impacts on biodiversity. This includes measures to protect endangered species and habitats, and to promote sustainable use of natural resources.	Applicable	The Project may require some, limited, vegetation clearance and may potentially impact on critical bird habitats. A CHA is required in the ESIA.
ESS7	Indigenous Peoples: Requires that projects respect the rights and interests of indigenous peoples. This includes measures to consult with indigenous peoples about the project, and to obtain their free, prior, and informed consent.	Potentially Applicable	Both ethnolinguistic groups are present in the Project area, namely in Cuanhama and Ombadja municipalities and, as such, in the ESIA phase, it will be necessary to assess whether the OHTL corridor will affect directly or indirectly any Indigenous People / Sub-Saharan African Historically Underserved Traditional Local Communities. If this happens then an Indigenous People / Sub-Saharan African Historically Underserved Traditional Local Communities Plan will have to be put in place, alongside with the project's Stakeholder Engagement Plan (SEP).
ESS8	Cultural Heritage: Requires that projects protect cultural heritage sites and artifacts. This includes measures to identify and assess potential impacts on cultural heritage, and to develop mitigation measures to avoid or minimize these impacts.	Applicable	A number of heritage sites have been identified in the Aol, requiring protection.
ESS9	Financial Intermediaries: Applies to projects that are financed through financial intermediaries, such as banks and investment funds. It requires that the financial intermediary implements a system for screening and managing E&S risks in its portfolio of investments.	Not Applicable	The Project is being financed.
ESS10	Information Disclosure and Stakeholder Engagement: Requires that projects be open and transparent about their E&S impacts. This includes measures to disclose information to affected communities, and to engage with them in a meaningful way.	Applicable	The Project will need to engage stakeholders in line with this ESS. A SEP with an actionable grievance redress system is required to be implemented.

5.0 Description of the Existing Environment

5.1 Physical Environment

5.1.1 Climate

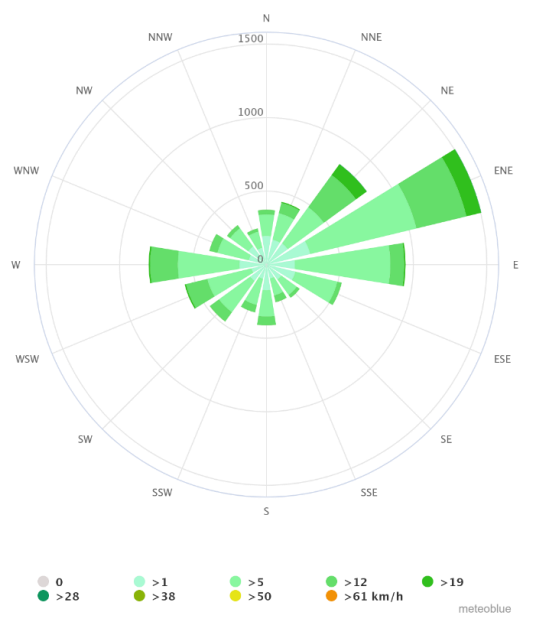
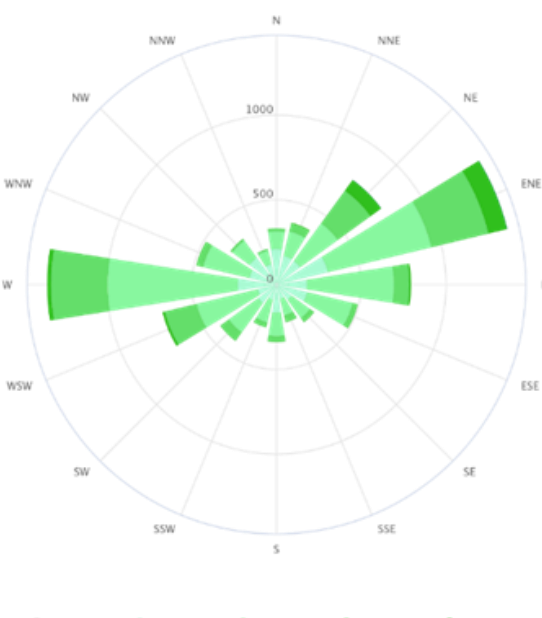
Due to its geographical position, Angola has three major climatic zones. The climate in the north is characterised as hot and humid, becoming increasingly drier to the south. The south-east portions of the country, on the border with Namibia, are characterised by desert climate, while the central plateau region has a temperate tropical climate. The coastal regions of the country are arid to semi-arid mostly due to the effects of the cold Benguela current. Angola currently has two main seasons. One is a hot and humid season in which the rainfall is greater, while the second season is generally cooler and drier.

The Cunene Province, located in the southern part of Angola, has a predominantly semi-arid to arid climate, characterised by a distinct wet and dry season. The climatic features are described hereunder.

5.1.1.1 Wind

Table 5-1: Prevailing Wind Direction and Speed in the Project Aol

Wind Rose	Description
Figure 5-1: Wind Rose in Ondjiva	In Ondjiva, the prevailing wind direction is primarily from the North-east and East-northeast. These winds are mainly driven by the trade winds, high-pressure systems over the South Atlantic, and the seasonal movement of the Intertropical Convergence Zone (ITCZ). The wind speed in this area typically does not exceed 50 km/h. It is influenced by regional pressure gradients, seasonal variations, and broader atmospheric circulation patterns.

Wind Rose	Description
 Figure 5-2: Wind Rose in Xangongo	Winds in Xangongo, are predominantly from the east-northeast due to the influence of the South Atlantic High, a high-pressure system that drives easterly winds across the region. However, winds can occasionally come from the west, particularly during the wet season when the ITCZ moves southward, bringing variable weather patterns. Local weather systems and diurnal temperature changes, such as those influenced by the Cunene River, can also contribute to these shifts in wind direction.
 Figure 5-3: Wind Rose in Cahama	The winds in Cahama, are predominantly from the east-northeast due to the influence of the South Atlantic High-pressure system, which drives stable easterly trade winds, especially during the dry season from May to October. However, during the wet season from November to April, the southward movement of the ITCZ brings more variable weather patterns, resulting in occasional westerly winds due to the development of low-pressure systems and thunderstorms. Wind speeds in Cahama can vary, typically influenced by these seasonal changes, with higher speeds occurring during periods of atmospheric instability and lower speeds during stable high-pressure conditions.

5.1.1.2 Temperature

Average mean surface temperatures have increased by approximately 1.4°C since mid-last century, accelerating significantly in recent years. This trend is projected to continue into the future. The southern portions of Angola have experienced a severe and protracted drought over the past decade, with conditions described as the worst in 40 years.

Temperatures in Cunene are generally high throughout the year, with average daily temperatures often exceeding 30°C (86°F). The hottest months tend to be October through December.

Table 5-2: Maximum and Minimum Monthly Air Temperatures in the Ondjiva¹¹

Air Temp. (°C)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	33	32	31	31	29	27	28	31	35	37	35	34
Minimum	21	21	20	19	14	10	9	12	15	19	21	21

Table 5-3: Maximum and Minimum Monthly Air Temperatures in the Xangongo¹²

Air Temp. (°C)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	33	32	31	31	30	28	28	31	35	36	35	34
Minimum	20	20	20	19	14	10	9	12	15	19	21	20

Table 5-4: Maximum and Minimum Monthly Air Temperatures in the Cahama¹³

Air Temp. (°C)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	32	31	31	31	30	28	28	31	35	36	34	33
Minimum	19	19	20	18	14	10	10	13	16	18	20	19

5.1.1.3 Rainfall

The Cunene Province experiences a semi-arid climate characterised by low and erratic rainfall. The Province is situated in a region where the climate is influenced by the Namib Desert to the west and the Kalahari Desert to the southeast, contributing to its arid conditions.

Rainfall in Cunene Province typically occurs during Angola's rainy season, which generally spans from November to April. These rains are crucial for agriculture and replenishing groundwater in the region. In recent years, Cunene Province, like other parts of southern Africa, has experienced periods of drought due to irregular rainfall patterns and climate variability, which has impacted local agriculture and livelihoods.

¹¹ Meteoblue (2023)

¹² Ibid.

¹³ Ibid.

Table 5-5: Average Monthly Amount of Rainfall in Ondjiva¹⁴

Rainfall (mm/month)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	87	77	61	12	1	0	0	0	2	16	48	64

Table 5-6: Average Monthly Amount of Rainfall in Xangongo¹⁵

Rainfall (mm/month)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	72	69	58	13	1	0	0	0	2	11	42	54

Table 5-7: Average Monthly Amount of Rainfall in Cahama¹⁶

Rainfall (mm/month)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	58	63	59	12	1	0	0	0	1	8	38	48

5.1.2 Geomorphology

The Cunene Province features diverse morphological landforms, including extensive plateaus and steep escarpments, fertile river valleys and floodplains carved by the Cunene River. These landforms are crucial for agriculture, livestock grazing, and local biodiversity, shaping the region's ecological and economic landscape.

Table 5-8: Description of the Morphological Landforms of the Cunene Province

Morphological Landform	Description
Plains and Plateaus	Much of Cunene is covered by flat plains and low plateaus, which are part of the larger Kalahari Basin. These areas are primarily composed of sandy soils, making them suitable for grazing but less ideal for intensive agriculture due to poor soil fertility and water retention capabilities. The elevation in the plains ranges from 1 100 to 1 300 meters above sea level (masl), offering extensive areas for pastoral activities.
Cunene River and Floodplains	The Cunene River is a major geomorphological feature, flowing from the Angolan highlands into Namibia and ultimately emptying into the Atlantic Ocean. The river's floodplains are crucial for agriculture, providing fertile soil and water for irrigation. Seasonal flooding creates rich alluvial deposits that support subsistence farming, particularly in regions close to the river.
Inselbergs and Rock Outcrops	Inselbergs, which are isolated hills or mountains, rise abruptly from the surrounding plains. These rock formations are remnants of ancient geological processes and are resistant to erosion. They provide unique habitats and are notable features in the landscape.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ *Ibid.*

5.1.3 Topography

The Cunene Province features diverse elevations, ranging from around 1 100 to 1 200 masl. The central region, including towns like Ondjiva and Xangongo, is characterised by relatively flat plains and gentle undulations, while areas like Cahama sit on slightly higher ground with more pronounced rolling terrain.

The general topography along the Aol is summarised in Table 5-9

Table 5-9: General Topography along the Aol

Sector	Description of Topography
Ondjiva	- Approximately 1 100 masl (3 609 feet) - Ondjiva is situated on relatively flat terrain, characteristic of the central part of Cunene Province. The city lies within a broad plain, which facilitates urban development and agricultural activities.
Xangongo	- Approximately 1 100 masl (3 609 feet) - Xangongo is also located on a flat to gently rolling terrain. It is situated near the Cunene River, which provides fertile floodplains for agriculture.
Cahama	- Approximately 1 200 masl (3 937 feet) - Cahama is located on slightly higher ground compared to Ondjiva and Xangongo. The terrain is characterised by a mix of flat and gently undulating plains.

5.1.4 Hydrology

Angola's river systems have profound influence on local water bodies and are significant to global wetlands; feeding into three wetlands of global importance (Okavango, Etosha and the Buluzi Floodplain of Moxico)¹⁷. In the Cunene Province, the Cunene River plays a crucial role in supporting regional hydrology and ecology. The river influences smaller water bodies, including numerous tributaries and streams that feed into it, creating a complex network of waterways.

5.1.4.1 Groundwater

A description of groundwater in the Projects Aol is presented in Table 5-10

Table 5-10: Main Geohydrological Features in Projects Aol

Type	Description
Quaternary Kalahari Group	The Kalahari Group is considered to potentially form a moderate to high productivity aquifer in some areas. This is due to the presence of sandstones and other sedimentary formations within the Kalahari Basin that can store and transmit groundwater. In northern parts of the Kalahari Group, such as in northern Angola and neighbouring countries, the water table tends to be shallower. This means that groundwater may be relatively easier to access through wells or boreholes in these regions. As you move southward within the Kalahari Group, including parts of southern Angola, the water table becomes deeper. This implies that groundwater is less accessible closer to the southern boundary of the Kalahari Basin. Towards the southern reaches of the Kalahari Group, particularly in areas like southern Angola, the aquifer is often described as being typically dry. This suggests that groundwater resources in these areas may be limited or not readily available for extraction due to deeper water tables or other geological factors that restrict water storage or movement.

¹⁷ Huntley et al., 2019

Type	Description
Alluvium Quaternary	At their most productive, alluvial sediments in river valleys form the best aquifers in Angola. Alluvial sediments typically consist of sands, gravels, and sometimes coarse silts. These materials have high permeability, meaning they can easily transmit and store significant quantities of groundwater. This makes them ideal for drilling wells and extracting water for various purposes.
Cretaceous–Tertiary	These aquifers, typically made of sandstones, limestones, and other sedimentary rocks, are known for their high porosity and permeability, making them productive sources of groundwater.
Karoo Supergroup - Carboniferous–Jurassic aquifer	The Karoo Supergroup, spanning from the Carboniferous to Jurassic periods, forms significant aquifers in inland southern Africa, including Angola. Comprising diverse sedimentary rocks such as sandstones, shales, and siltstones, these formations are highly productive, particularly the sandstone aquifers due to their good porosity and permeability.

5.1.4.2 Surface Water

A description of surface water in the Projects Aol is presented in Table 5-11

Table 5-11: Description of Surface Water in the Aol

Type	Description
Rivers	The Cunene River is the primary surface water body in the Province, originating in the Angolan highlands and flowing into Namibia before reaching the Atlantic Ocean.
Dams	Dams and reservoirs, like the Calueque Dam, help regulate water flow, provide irrigation, and support hydroelectric power generation.
Tributaries and Streams	Numerous tributaries and streams feed into the Cunene River, expanding the surface water network. These smaller watercourses are essential for local agriculture and ecosystems.

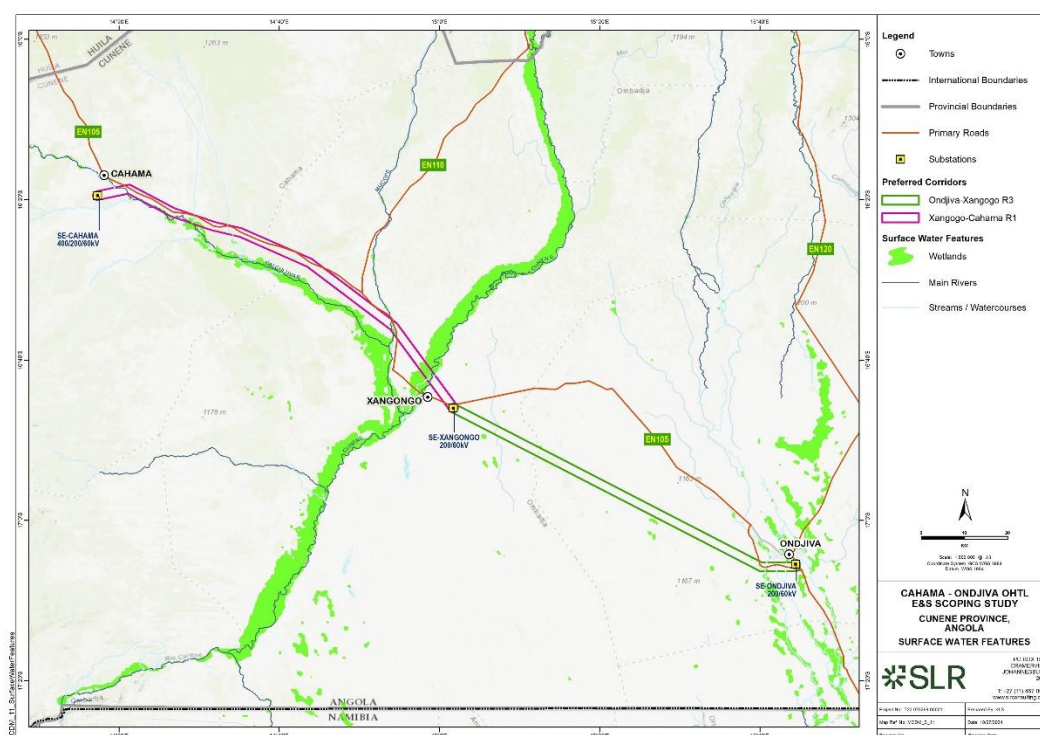


Figure 5-4: Surface Water Resources in the Project Aol

5.1.4.3 Flood Risk

The Cunene Province faces significant flood risks, primarily due to the seasonal overflow of the Cunene River and its tributaries. Heavy rainfall during the wet season often leads to riverbanks breaching, inundating nearby communities and agricultural lands. The flat terrain of the region exacerbates the situation, as water spreads quickly and takes longer to recede.

5.1.5 Air Quality

The air quality in the Cunene Province is generally influenced by both natural and human activities. The region's rural nature means that air pollution levels are typically lower than in urban areas. However, seasonal factors such as dust storms during the dry season and biomass burning for agriculture can impact air quality, leading to increased particulate matter in the atmosphere.

5.2 Biophysical Environment

5.2.1 Terrestrial Ecoregions

The Projects Aol is located in the Tropical and Subtropical Grasslands, Savannas and Shrublands biome¹⁸, and comprises two terrestrial ecoregions, namely Zambezian *Baikiaea* Woodlands and Angolan Mopane Woodlands¹⁹. Both of these are described in more detail below²⁰.

5.2.1.1 Zambezian *Baikiaea* Woodlands

This ecoregion covers approximately 264 400 km² and stretches from southern Angola and north-eastern Namibia through south-western Zambia and northern Botswana to western Zimbabwe. The ecoregion lies on a large plain between 800 and 1 000 masl that is drained by the Okavango, Cuando, and Upper Zambezi rivers. Vegetation comprises a mosaic of *Baikiaea plurijuga*-dominated forest, woodland, thicket, and secondary grassland. Plant species richness is moderate (1 400 spp), although the ecoregion is partially located in the Barotse subcentre of plant endemism and number of endemics is high, especially species confined to Kalahari sands. Mammal species richness is moderate and is characterised by widespread savannah species. A number of threatened mammals occur, including Black Rhinoceros (*Diceros bicornis*), Lion (*Panthera leo*), African Wild Dog (*Lycaon pictus*), Cheetah (*Acinonyx jubatus*), and African Savannah Elephant (*Loxodonta africana*). The ecoregion is home to some of the largest elephant populations in Africa and transboundary movements between countries regularly occur. numbers. Avifauna species richness is high (507 spp), although only two species are endemic or near-endemic to the ecoregion. Threatened species are well represented, including several vulture species, Steppe Eagle (*Aquila nipalensis*), Bateleur (*Terathopius ecaudatus*), Grey Crowned Crane (*Balearica regulorum*) and Southern Ground Hornbill (*Bucorvus leadbeateri*). Herpetofauna species richness is moderate and only one amphibian and three reptiles are near-endemic to the region.

The ecoregion is sparsely settled away from major roads and towns, with fewer than five people per square kilometre. Sandy soils are nutrient-poor, and the long dry season is not optimal for agriculture, resulting in low levels of habitat modification and fragmentation. Approximately 13% of the ecoregion is conserved in large national parks and game

¹⁸ Olson et al., 2001

¹⁹ Burgess et al., 2004

²⁰ Ibid.

management areas. Two national parks partially within this ecoregion are located close to the project area, namely Bicular in Huíla Province and Mupa National Parks in Cunene Province.

5.2.1.2 Angolan Mopane Woodlands

The Angolan Mopane Woodlands ecoregion is a small ecoregion lying in the Owambo Basin on the western edge of the Central African Plateau, at around 1 000 m in elevation, covering approximately 133 500 km² of south-western Angola and northern Namibia. Two main river systems, both originating in the highlands in Angola, drain much of this ecoregion, namely the Kunene River and the Cuvelai Drainage Basin. A wide variety of vegetation types are represented, particularly Mopane shrublands and woodlands, which cover vast areas and sometimes form low, thorny bushveld when associated with *Acacia* species. Ephemeral pans and drainage lines are quite prominent and have a rich aquatic flora. Plant diversity is moderate (approximately 1 100 species) and endemism is low. Mammal populations have declined significantly, partly as a result of the long civil war in Angola. The largest mammal populations in the ecoregion are in northern Namibia, particularly in and around Etosha National Park. About 125 mammal species occur in the ecoregion, three of which are near-endemic, and threatened species include African Savannah Elephant, Black Rhinoceros, Lion, Cheetah and Black-faced Impala (*Aepyceros melampus petersi*). Avifauna species richness is moderate, with 383 species having been recorded, of which ten are near-endemic. Herpetofauna are notably diverse, with 101 reptiles and 20 amphibian species known to occur, including 23 endemic reptiles and three endemic amphibians.

Two national parks in Angola are partially located in this ecoregion, namely Bicular and Mupa National Parks, both of which occur to the north and north-east of the project area.

5.2.2 Natural and Modified Habitat

IFC PS 6 defines natural habitat as “areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area’s primary ecological functions and species composition”²¹. Modified habitat is defined as “areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area’s primary ecological functions and species composition”. Modified habitat mostly has low biodiversity value in comparison to natural habitat, but in some cases can support high biodiversity value.

PS6 requirements with regards to natural habitat are that no significant conversion or loss of natural habitat should take place, unless it can be demonstrated that no other viable alternatives exist for development on nearby modified habitat. In addition, where natural habitat will be affected, appropriate implementation of the Mitigation Hierarchy needs to result in a no net loss of biodiversity.

The project is located in a mosaic of modified and natural habitat. Modified habitat comprises human settlements (villages, towns, rural settlements), cultivated lands and other man-made infrastructure (roads, airstrips, etc), and is concentrated along the Cahama – Ondjiva road. Natural habitat comprises various woodland and savannah types, as well as floodplain and riparian wetlands. It is particularly well represented south of the Cahama – Xangongo road and further north of the project area in Mupa National Park, but poorly represented along the preferred OHTL alignment, particularly between Xangongo and Ondjiva (Figure 5-6).

²¹ IFC, 2012.



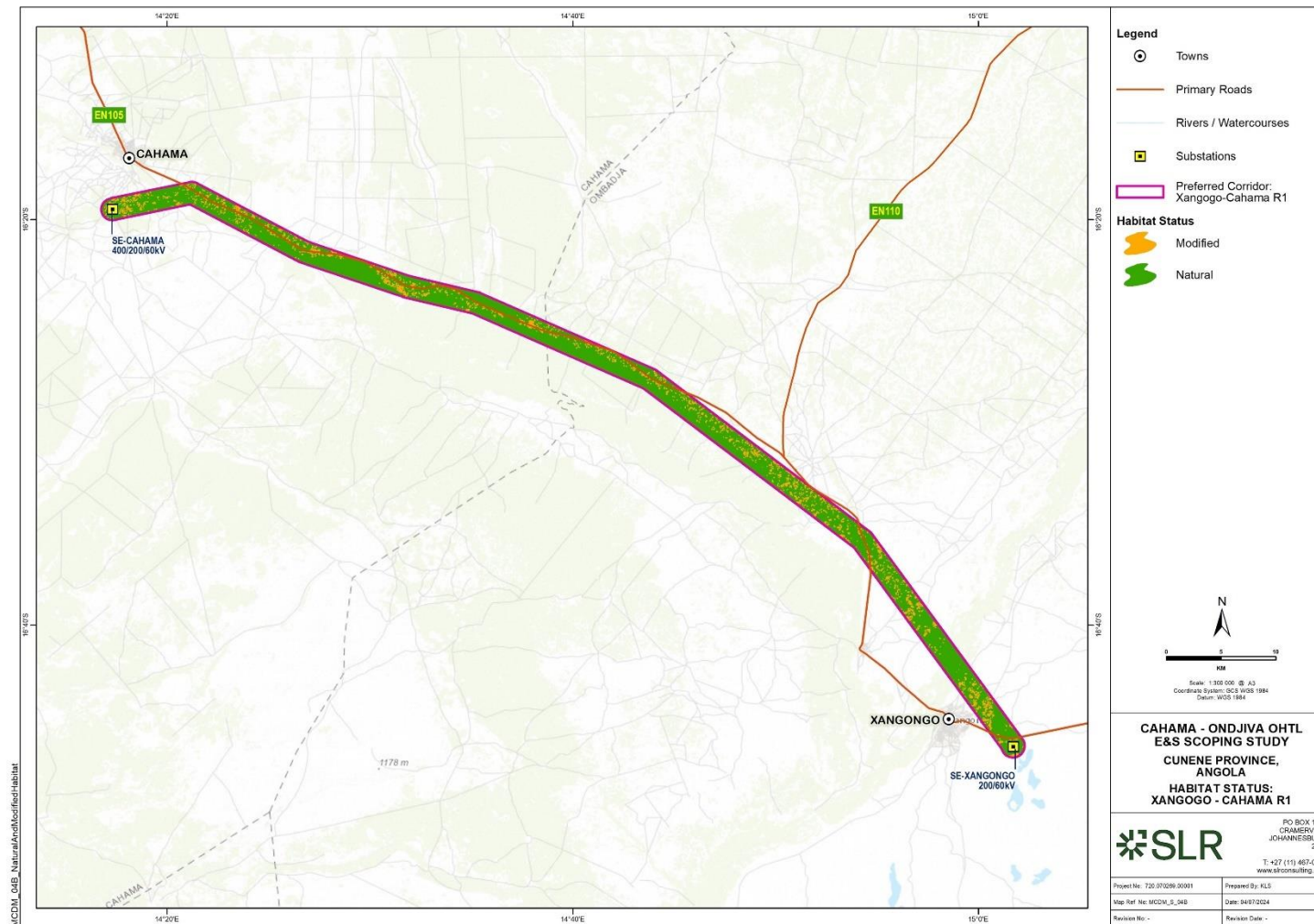


Figure 5-6: Natural and Modified Habitat along the Cahama – Xangongo and Xangongo – Ondjiva Routes

5.2.3 Ecologically Important Areas

5.2.3.1 Protected Areas

The Project area does not overlap with any protected areas. The closest protected areas are two national parks to the north, namely Mupa National Park (58 km north of Ondjiva) and Bicuar National Park (80 km north of Cahama) and Oncôncua Special Reserve (100 km southeast of Cahama). Although both parks and reserve are some distance from the Project area, there is the likelihood of movement of some fauna species south into the vicinity of the project and thus the three areas are described in more detail below and the proximity of the project to both areas is indicated in Figure 5-7.

Mupa National Park

This national park is located on the Huíla Plateau, about 215 km southeast of Lubango and 58 km north of Ondjiva, covering approximately 6 600 km². The protected area was initially proclaimed in 1938 as a reserve to protect a population of the Angolan subspecies of Giraffe (*Giraffa giraffa angolensis*) and was upgraded to a national park in 1964 (Huntley, 1974). However, in the 1970s and 1980s large numbers of African Buffalo (*Syncerus cafer*), Giraffe and Impala (*Aepyceros melampus*) were hunted for military rations and by the early 1970s the giraffe population had been exterminated. Large parts of the park were heavily settled, particularly around permanent water, and recent estimates are that approximately 18, 000 people are resident in the park, engaged mostly in agriculture and livestock farming²².

Mammal surveys conducted in Mupa National Park (NP) in August 2016 reported that mammals were present in lower abundance and diversity than in nearby Bicuar NP and were mostly confined to areas with low human density²³. Leopard (*Panthera pardus*) and Spotted Hyaena (*Crocuta crocuta*) were the most common large carnivores reported, with African Wild Dog (*Lycaon pictus*) present in low numbers in remote parts of the park. Nine species of medium and small carnivores were detected, including Serval (*Leptailurus serval*), Caracal (*Caracal caracal*), Black-backed Jackal (*Lupulella mesomelas*), Side-striped Jackal (*Lupulella adustus*) and Honey Badger (*Mellivora capensis*). Antelope still present in the park are Common Duiker (*Sylvicapra grimmia*), Steenbok (*Raphicerus campestris*), Roan (*Hippotragus equinus*) and Greater Kudu (*Tragelaphus strepsiceros*). No herds of African Elephant (*Loxodonta africana*) were encountered, and other absent threatened mammals were Hippopotamus (*Hippopotamus amphibius*), Lion (*Panthera leo*) and Cheetah (*Acinonyx jubatus*).

Bicuar National Park

Bicuar NP is located on the Huíla Plateau approximately 175 km south-east of Lubango and 80 km north of Cahama, covering 7 900 km² of open grassy plains on seasonally waterlogged depressions and a variety of savannah, woodland and thicket communities. It was established as a hunting reserve in 1938 and upgraded to a national park in 1964 and was known for herds of large mammals such as African Buffalo, African Elephant, Plains Zebra (*Equus quagga*), Eland (*Tragelaphus oryx*), Blue Wildebeest (*Connochaetes taurinus*), Black-faced Impala (*Aepyceros melampus* ssp. *petersi*), Defassa Waterbuck (*Kobus ellipsiprymnus* ssp. *defassa*) and Giraffe²⁴. Mammal populations suffered heavily during the Angola civil war (1975-2002) and most large mammals were exterminated. However, the Angolan government has begun

²² Overton et al., 2017

²³ Ibid.

²⁴ Huntley, 1974

rebuilding infrastructure and protect animals and since 2013 it has been reported that some of the large mammals are returning to Bicular²⁵.

Mammal surveys conducted in Bicular NP in September 2016 reported that numbers and diversity of mammals were higher than in the more heavily settled Mupa NP²⁶. Leopard and Spotted Hyaena were the most common large carnivores, with small numbers of African Wild Dog also encountered. Medium-sized and small carnivores included Serval, Caracal, Black-backed Jackal, African Wild Cat (*Felis lybica*), Honey Badger, Bat-eared Fox (*Otocyon megalotis*), Cape Fox (*Vulpes chama*) and Aardwolf (*Proteles cristata*). Evidence of the presence of African Elephant and several antelope species was observed, including Common Duiker, Steenbok, Roan, Greater Kudu and Eland. A single zebra was reported by the park manager, and possible zebra spoor was seen at Tumbaeque water hole.

Oncócuá Special Reserve

The Oncócuá Special Reserve, located between Namibe and Cunene Provinces was established in 1964 to protect the region's declining wildlife including rhinos. It covers an area of approximately 2,829 km². This reserve used to be home to diverse wildlife species including giraffes, hyenas, leopards, rhinos, hippos, zebras, elephants. The area is characterized by its unique landscapes, including forests, savannas, and steppes, making it a significant ecological site in the region. This reserve borders Iona National Park to the west.

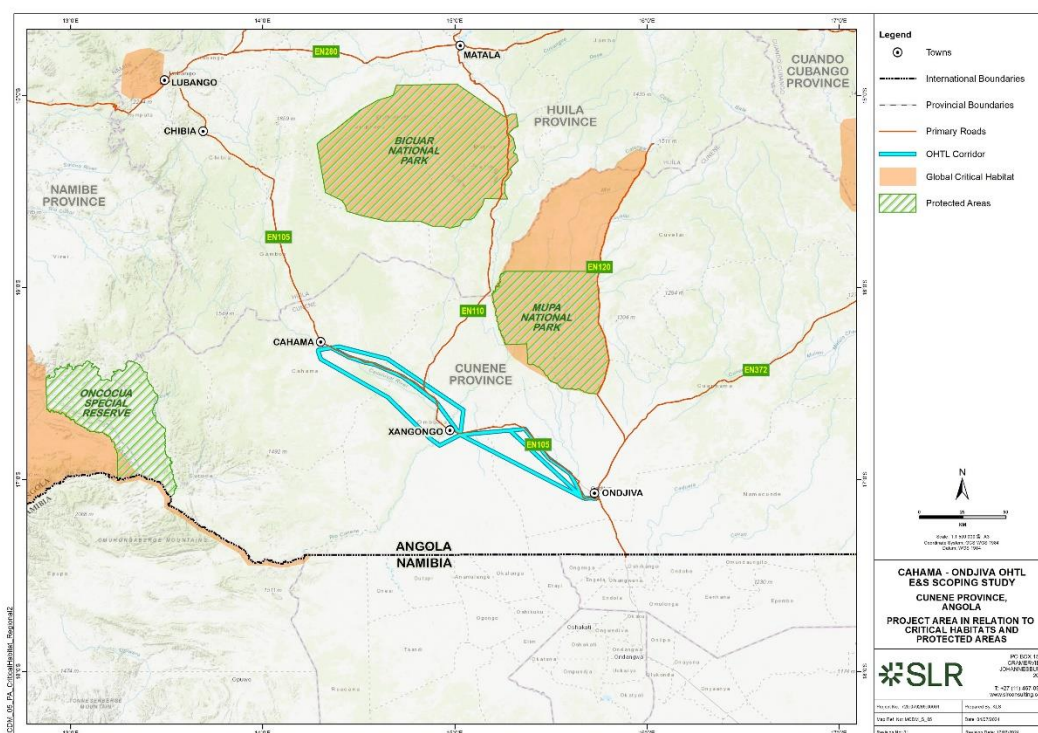


Figure 5-7: Location of the Project Area in relation to Protected Areas and Key Biodiversity Areas

²⁵ http://www.portalangop.co.ao/angola/en_us/noticias/ambiente/2013/1/5/Animals-return-Bicular-National-Park,621ab76a-66f5-4849-8fa6-77542e67381f.html

²⁶ Overton et al., 2017

5.2.3.2 Key Biodiversity Areas / Important Bird Areas

Two Important Bird and Biodiversity Areas (IBAs) have been designated to the north of the Project area, namely Mupa and Bicuar NPs, both of which are now also classified as Key Biodiversity Areas (KBAs). Both parks are described in more detail in **Section 5.2.3.1**, but the drivers of IBA / KBA status for each are discussed hereunder.

Mupa National Park KBA

The avifauna of the park has been poorly studied but historical studies have reported relatively high species-richness of Zambezian biome-restricted species such as Pale-billed Hornbill (*Lophoceros pallidirostris*), Miombo Tit (*Melaniparus griseiventris*), Miombo Wren-warbler (*Calamonastes undosus*) and White-winged Babbling Starling (*Neocichla gutturalis*)²⁷. The wetland habitats along the Calongo and Cuvelai rivers support reasonable numbers of the globally threatened Wattled Crane (*Grus carunculatus*), which probably breeds in these wetlands. Extensive floodplain wetland and lake habitat support at least 31 species of waterbird (21% of Angolan list), some in numbers which are at least nationally significant. It is possible that there are regular movements of waterbirds between southern Angola and wetlands further south, potentially crossing through the project area.

Bicuar National Park KBA

The avifauna of this park has also not been well studied and only five Zambezian biome-restricted species and one Kalahari-Highveld endemic have been recorded, although there likely to be others. Confirmed biome-restricted endemics include Burchell's Starling (*Lamprotornis australis*), White-winged Babbling Starling, Fülleborn's Longclaw (*Macronyx fülleborni*) and White-tailed Shrike (*Lanioturdus torquatus*)²⁸.

This is one of the few reserves in Angola that supports both miombo (Zambezian) bird species as well as species more typical of the southern dry broadleaved woodlands (Kalahari-Highveld). Threatened birds recorded in the park include Critically Endangered (CR) species such as Hooded Vulture (*Necrosyrtes monachus*) and White-headed Vulture (*Trigonoceps occipitalis*), Endangered (EN) species such as Lappet-faced Vulture (*Torgos tracheliotos*) and Bateleur (*Terathopius ecaudatus*) and Vulnerable (VU) species such as Tawny Eagle (*Aquila rapax*) and Southern Ground Hornbill (*Bucorvus leadbeateri*)²⁹. Most of these species are likely to occur outside of the park as well, potentially even in the project area. Wetlands in the park support at least 36 species of waterbirds (25% of the Angolan list), some in nationally significant numbers, including the only Angola records of the Endangered Maccoa Duck (*Oxyura maccoa*).

5.2.3.3 Endemic Bird Areas

The project is not located within any Endemic Bird Areas (EBA), with the closest being the Western Angola EBA, approximately 120 km to the north-west of Cahama.

5.2.3.4 Ramsar Wetlands

The project is not located within any designated Ramsar Wetlands of international importance nor to proposed Ramsar sites. The closest Ramsar wetland is the Okavango Delta System in northern Botswana.

²⁷ <https://datazone.birdlife.org/site/factsheet/mupa-national-park-iba-angola/refs>

²⁸ <https://datazone.birdlife.org/site/factsheet/bicuari-national-park-iba-angola/details>

²⁹ Dean, 2001

5.2.3.5 Alliance for Zero Extinction Sites

The project is not located within any Alliance for Zero Extinction (AZE) sites. The nearest is the Gabela AZE in west-central Angola, far north of the project area.

5.2.4 Potentially Occurring Threatened Flora and Fauna

Twenty-six threatened birds, mammals, fish and plant species have distributions that overlap with the Project area (Table 5-12). Occurrence records of CR and EN species extracted from the Global Biodiversity Information Facility (GBIF) are displayed in Figure 5-8. Some of these are historical records of species that no longer occur in the area (e.g., Black Rhino) but some are known to still occur in nearby Mupa and Bicular National Parks and Oncócuá Reserve and may irregularly occur in the vicinity of the project. Ten species have a high likelihood of occurring in close proximity to the Project area and are described in more detail hereunder.

5.2.4.1 Grey Crowned Crane (*Balearica regulorum*)

This crane species occurs across eastern and southern Africa, including southern and south-western Angola. It has been assessed as EN by the IUCN as a result of very rapid population declines in certain areas in the past 45 years as a result of habitat loss and illegal removal of birds and eggs from the wild³⁰. Favoured habitat is wetlands such as marshes and pans with emergent vegetation, riverbanks, open riverine woodland, shallowly flooded plains and temporary pools. Such habitat is present in the Project area along the floodplains of the Cunene River and its tributary and these are the most likely areas where this species could be present, although this species has not been confirmed in the area. This is a high-risk species for collisions and electrocutions on OHTLs.

5.2.4.2 Martial Eagle (*Polemaetus bellicosus*)

Martial Eagle is widespread in Africa, occurring in a wide range of savannah and woodland types. It is distributed in low numbers throughout much of Angola, with confirmed records from southern Angola along the Namibia border and in Bicular NP³¹. It has been classified as EN by the International Union for Conservation of Nature (IUCN) as a result of suspected very rapid declines during the past 33 years as a result of deliberate poisoning, habitat loss, reduction in prey availability, pollution and collisions with OHTLs³². This species is more likely to be encountered away from human settlements and cultivated lands, although may pass through the Project area when foraging. It is a high-risk species for electrocution and collisions with OHTLs.

5.2.4.3 Secretarybird (*Sagittarius serpentarius*)

Secretarybird is widespread throughout the savannahs and grasslands of southern and tropical Africa, avoiding the forested Congo Basin and upper Guinea region. It occurs in small numbers throughout much of Angola, although few records exist for southern and south-western Angola. However, this may be as a result of low observer coverage as it is frequently observed in northern Namibia³³. It has been classified as EN by the IUCN as a result of suspected severe population declines in some countries, probably owing to habitat degradation, disturbance, hunting and capture for trade³⁴. Suitable habitat is present in the

³⁰ BirdLife International, 2016a

³¹ https://www.gbif.org/occurrence/map?taxon_key=2480426

³² BirdLife International, 2020a

³³ https://www.gbif.org/occurrence/map?taxon_key=5229409

³⁴ BirdLife International, 2020b

Project area away from human settlements and cultivated lands and it may occur infrequently in these areas. It is a moderate-risk species for electrocution and collisions with OHTLs.

5.2.4.4 Bateleur (*Terathopius ecaudatus*)

Bateleur is widespread across tropical and southern Africa, only avoiding the densely forested areas of the Congo Basin and upper Guinea. It occurs in a wide range of woodland and savannah types and is distributed throughout Angola. It has been classified as EN by the IUCN as a result of very rapid declines over the past 46 years as a result of deliberate and incidental poisoning, pesticides and nest disturbance³⁵. Much suitable habitat is present in the Project area and there are confirmed records from the general vicinity (Figure 5-8)³⁶, and this species is highly likely to be a regular non-breeding visitor. Breeding is only likely to occur in nearby areas of intact woodland such as Mupa and Bicuar National Parks. This is a moderate-risk species for electrocution and collisions with OHTLs.

5.2.4.5 Tawny Eagle (*Aquila rapax*)

This bird of prey is widespread across sub-Saharan Africa, occurring in the Arabian Peninsula and the Indian sub-continent. It occurs in a variety of woodland and wooded savannah habitats. Scattered records exist for Angola, although few for the southern and south-western regions³⁷. However, there are numerous records from across the border in northern Namibia and the paucity of records in Angola is more likely linked to few observers. The species has been recorded in Bicuar National Park³⁸ and it is likely to forage occasionally over the Project area. It has been classified as VU by the IUCN as a result of suspected rapid declines in certain countries as a result of deliberate and incidental poisoning, collisions with vehicles when foraging on roadside carcasses, and collisions with overhead transmission lines³⁹. This is a high-risk species for electrocution and collisions with OHTLs.

5.2.4.6 Southern Ground-hornbill (*Bucorvus leadbeateri*)

Southern Ground-hornbill occurs across southern and eastern Africa, including much of Angola. It occurs woodland and savanna, particularly in protected areas but also in areas of woodland which are grazed by livestock, such as in the Project area. There are a number of recent records from the Cunene River in south-western Angola, including at Xangongo in the Project area (Figure 5-8)⁴⁰ and it is likely to be present away from human settlements and cultivated lands. Southern Ground-hornbill has been assessed as VU by the IUCN as a result of very rapid population declines in South Africa and Namibia due to poisoning, trade and persecution⁴¹. It is a high-risk species for electrocution and collisions with OHTLs.

5.2.4.7 Red-footed Falcon (*Falco vespertinus*)

This widespread falcon breeds in eastern Europe and western and central Asia, migrating in the non-breeding season to southern and south-central Africa, including southern and south-western Angola. There are few GBIF records for Angola, although numerous records for northern Namibia along the Angola border⁴² and the paucity of Angolan records most likely reflects a paucity of observers. Red-footed Falcon has been assessed by the IUCN as VU as

³⁵ BirdLife International, 2020c

³⁶ https://www.gbif.org/occurrence/map?taxon_key=2480377

³⁷ https://www.gbif.org/occurrence/map?taxon_key=2480514

³⁸ <https://datazone.birdlife.org/site/factsheet/bicuari-national-park-iba-angola/text>

³⁹ BirdLife International, 2021a

⁴⁰ https://www.gbif.org/occurrence/map?taxon_key=2476041

⁴¹ BirdLife International, 2016b

⁴² https://www.gbif.org/occurrence/map?taxon_key=2481062

a result of a rapid population decline, owing to habitat loss and degradation, particularly in European and Asian breeding grounds⁴³. The species is likely to occur anywhere in the Project area apart from densely settled areas. It is a low-risk species for electrocution and collisions with OHTLs.

5.2.4.8 Three-spot Tilapia (*Oreochromis andersonii*)

Three-spot Tilapia is endemic to the Zambezi (mostly upper reaches), Kafue, Okavango and Cunene Rivers in parts of Zambia, Zimbabwe, Botswana, Namibia and Angola. It occurs in a variety of habitats in rivers and floodplain lagoons, large open swamps, and occasionally in small tributaries of the rivers⁴⁴. The species has been assessed as VU by the IUCN as a result of increasingly widespread use of small-meshed fishing nets, as well as the introduction and spread of the invasive *Oreochromis niloticus* which tends to outcompete other *Oreochromis* species. It has a high likelihood of being present in the section of the Cunene River which is crossed by the Project route.

5.2.4.9 Longfin Tilapia (*Oreochromis macrochir*)

Longfin Tilapia occurs naturally in the Upper Zambezi, Okavango and Kafue Rivers, as well as the upper Kasai, Lake Bangweulu and the Chambeshi River, and a relict population central Mozambique. It prefers quiet waters along river margins and backwaters, and in floodplain habitats⁴⁵. The primary threat facing this species is the introduction and spread of the invasive *Oreochromis niloticus* which displaces it wherever they co-occur. *O. niloticus* will likely spread into the Okavango, thus the Cunene may remain the only safe refuge for this species⁴⁶. It has a high likelihood of being present in the section of the Cunene River which is crossed by the Project route.

5.2.4.10 Leopard Orchid (*Ansellia africana*)

Leopard Orchid is widespread in southern and tropical Africa and occurs in a variety of woodland and forest types throughout Angola⁴⁷, particularly riverine vegetation as well as mopane woodlands near rivers, which are habitats represented in the Project area. It has been assessed as VU by the IUCN as a result of a predicted rapid population decrease because of harvesting for traditional medicine and commercial horticulture⁴⁸.

⁴³ BirdLife International, 2021b

⁴⁴ Tweddle & Marshall, 2007

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ https://www.gbif.org/occurrence/map?taxon_key=2842140

⁴⁸ Crook, 2013

Table 5-12: Potentially Occurring Threatened Species in the Vicinity of the Project Area

Common Name	Scientific Name	IUCN Status	Habitat	Likelihood	Rationale
Avifauna					
White-backed Vulture	<i>Gyps africanus</i>	CR	Open wooded savanna, particularly areas of Acacia.	Low	Suitable habitat present, but rare or possibly extinct in southern Angola
Hooded Vulture	<i>Necrosyrtes monachus</i>	CR	Open grassland, forest edge, wooded savanna, desert and along coasts.	Low	Suitable habitat present, but rare or possibly extinct in southern Angola
White-headed Vulture	<i>Trigonoceps occipitalis</i>	CR	Prefers mixed, dry woodland at low altitudes, avoiding semi-arid thornbelt areas	Low	Suitable habitat present, but rare or possibly extinct in southern Angola
Steppe Eagle	<i>Aquila nipalensis</i>	EN	Occurs in open savannah to closed mixed woodland	Moderate	Some suitable habitat present
Grey Crowned Crane	<i>Balearica regulorum</i>	EN	Wetlands such as marshes, pans and dams with tall emergent vegetation, shallowly flooded plains with adjacent grasslands, and open savannas.	High	Much suitable habitat present
Martial Eagle	<i>Polemaetus bellicosus</i>	EN	Wide variety of woodland and savannah types	High	Much suitable habitat present
Secretarybird	<i>Sagittarius serpentarius</i>	EN	Inhabits open landscapes, ranging from open plains and grasslands to lightly wooded savanna, but is also found in agricultural areas and sub-desert.	High	Much suitable habitat present
Bateleur	<i>Terathopius ecaudatus</i>	EN	Wide variety of woodland and savannah types	Confirmed	Recent GBIF records from vicinity of Xangongo
Lappet-faced Vulture	<i>Torgos tracheliotos</i>	EN	Inhabits dry savanna, arid plains, deserts and open mountain slopes	Low	Suitable habitat present, but rare or possibly extinct in southern Angola
Tawny Eagle	<i>Aquila rapax</i>	VU	Wide variety of woodland and savannah types	High	Much suitable habitat present
Southern Ground-hornbill	<i>Bucorvus leadbeateri</i>	VU	Wooded savannah and woodland types	High	Much suitable habitat present nearby
Wattled Crane	<i>Bugeranus carunculatus</i>	VU	Breeds on large low-lying tropical, seasonal flood plains adjacent to grasslands	Moderate	Project area at edge of distribution, , but known from nearby Mupa NP

Common Name	Scientific Name	IUCN Status	Habitat	Likelihood	Rationale
Slaty Egret	<i>Egretta vinaceigula</i>	VU	River floodplains, marshes, and temporary shallow wetlands	Moderate	Probably irregular non-breeding visitor. Suitable habitat along Cunene and tributary
Red-footed Falcon	<i>Falco vespertinus</i>	VU	Migrant overwintering in southern Africa. Occurs in a range of grassland, shrubland and savannah types.	High	Much suitable habitat present
Cape Vulture	<i>Gyps coprotheres</i>	VU	Occurs in a wide range of grassland and savannah types where livestock or large game present; breeds on cliffs	Moderate	Suitable habitat present, but possibly an irregular non-breeding visitor
Mammals					
Black Rhino	<i>Diceros bicornis</i>	CR	Wide variety of woodland and savannah types	Very Low	Present historically but unlikely to exist in project area since civil war.
African Savanna Elephant	<i>Loxodonta africana</i>	EN	Wide variety of woodland and savannah types	Low	Has been extirpated from much of southern Angola, outside of protected areas but exists in Bicular National park.
Hippopotamus	<i>Hippopotamus amphibius</i>	VU	Large rivers, floodplain wetlands, lakes and artificial impoundments	Low	Occurs in upper reaches of Cunene but appears to be extinct in southern Cunene.
Temminck's Pangolin	<i>Smutsia temminckii</i>	VU	Wide variety of woodland and savannah types	Low	Suitable habitat present but presence of high human density and settlements
Leopard	<i>Panthera pardus</i>	VU	Wide variety of woodland and savannah types	Low	Suitable habitat present but presence of high human density and settlements
Fish					
Threespot Tilapia	<i>Oreochromis andersonii</i>	VU	Variety of habitats in rivers and floodplain lagoons, large open swamps, and occasionally in small tributaries of the rivers	High	Much suitable habitat present

Common Name	Scientific Name	IUCN Status	Habitat	Likelihood	Rationale
Longfin Tilapia	<i>Oreochromis macrochir</i>	VU	Found in quiet waters along river margins and backwaters, and in floodplain habitats	High	Much suitable habitat present
Plants					
Leopard Orchid	<i>Genlisea angolensis</i>	EN	Wet meadows, usually in shady stagnating waters.	Moderate	Some suitable habitat present
	<i>Monotes rubriglans</i> subsp. <i>rubriglans</i>	EN	Occurs in dry woodland and savannah, often along riverbanks	Low	Record from near Xangongo in IUCN cannot be traced in GBIF
	<i>Ansellia africana</i>	VU	Wide variety of woodland and savannah types	High	Much suitable habitat present
	<i>Inversodicraea warmingiana</i>	VU	Aquatic herb growing on rocks in waterfalls and rapids	Low	Very limited or no suitable habitat present

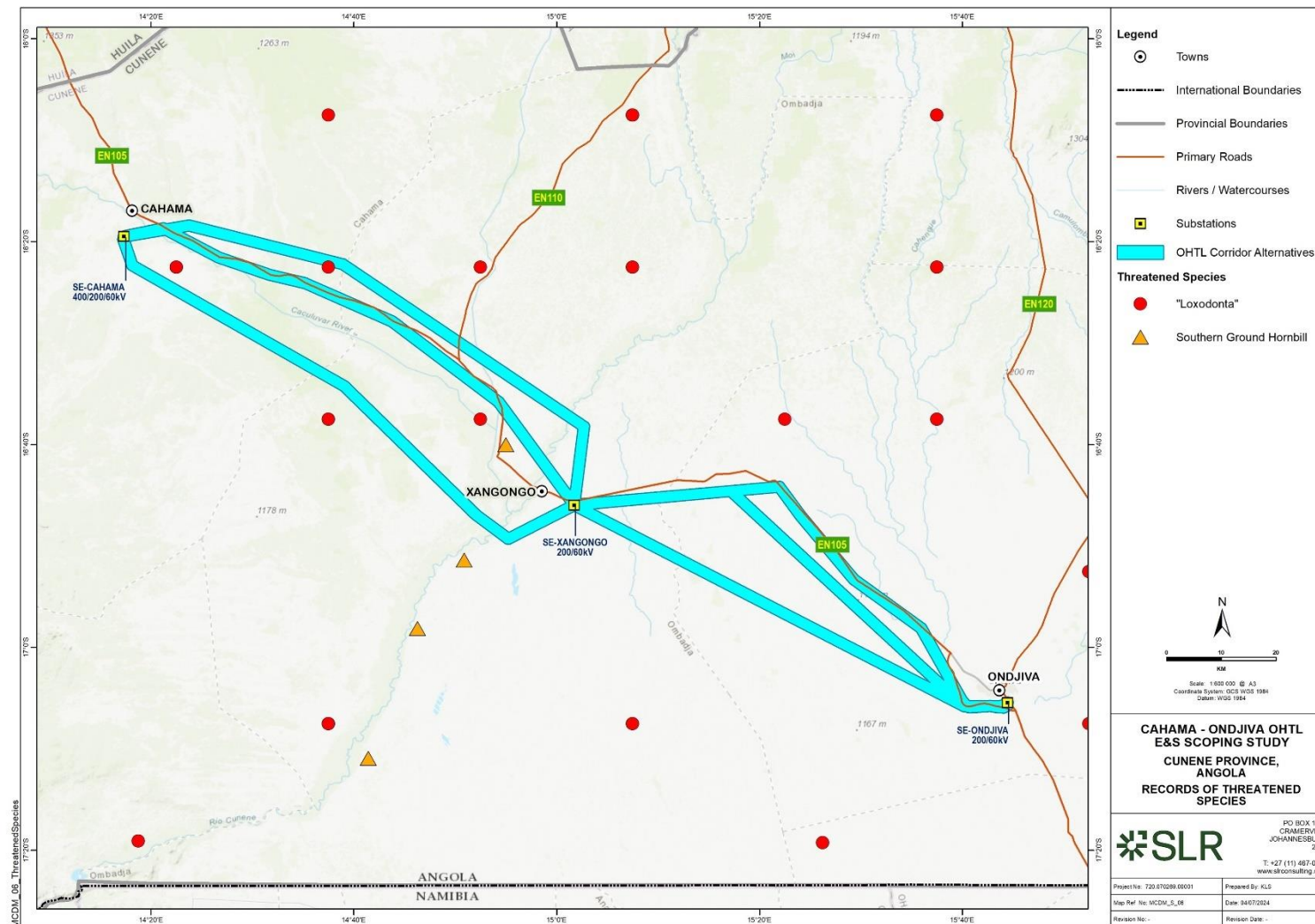


Figure 5-8: Occurrence Records of Critically Endangered and Endangered Species in the Vicinity of the Project Area

5.3 Socio-Economic Environment

The OHTL and its associated infrastructure extend throughout the Cunene Province in southern Angola. Starting from Ondjiva, the provincial capital, and running in a north-westerly direction, the OHTL passes through the city of Xangongo and ultimately links to the existing Namibian and Angolan electricity network in Cahama city.

For the purposes of this assessment, the focus is on the Province and, when possible, down to municipal level. As this OHTL will serve primarily the urban centres of Ondjiva, Xangongo and Cahama, an overview of their main characteristics is also provided.

5.3.1 Administrative Context

Administratively, Angola is divided into Provincial Governments which are divided into Municipalities; each with their own governance and development priorities. Each Municipality is then subdivided into communal administrations. The corridor for the OHTL crosses the following administrative limits (Table 5-13 and Figure 5-9). Cunene province's political and administrative division is constituted by six municipalities and 20 communes, but the OHTL only covers three municipalities as shown below.

Table 5-13: Administrative Levels within the Project Area

Provincial Government	Municipal Administration	Communal Administration
Cunene	Cahama	Cahama
	Ombadja	Humbe
		Mucope
		Xangongo
	Cuanhama	Môngua
		Ondjiva

Cunene Province, with a total area of 78 342 km², is comprised of the Cahama, Cuanhama, Curoca, Cuvelai, Namacunde and Ombadja municipalities, with Ondjiva City the capital.

The Municipality of Cahama, situated in the north-east of Cunene Province, has a surface area of 9 725 km², and incorporates, from a political and administrative point of view, the communal administrations of Cahama and Otchinjau. It is bordered to the north by the Municipalities of Gambos and Matala of Huila Province, to the west-southwest by the Curoca Municipality, and to the south-southeast by Ombadja Municipality.

The Municipality of Ombadja, has 12 264 km², and is situated in the centre / south of Cunene Province. It is bordered to the north by the Municipalities of Matala (Huila Province) and Cuvelai, to the west by Cahama Municipality, south-southwest by Curoca Municipality, east by the Municipalities of Cuanhama and Namacunde and to the south with Namibia. It entails the communal administrations Humbe, Mucope / Mucoma, Naulila, Ombala-Yo-Mungo and Xangongo (which houses the municipal administration).

Cuanhama Municipality, situated in the south of Cunene Province, covers 20 255 km², and it houses Ondjiva city, where the provincial government and municipal administration are located. It is bordered to the north by Cuvelai Municipality, to the east by Menongue Municipality, to the south by Namacunde Municipality, and to the west by the Ombadja Municipality. The municipality is made up by the head Commune, Ondjiva city, and by Môngua, Evale, Nehone Cafima and Simporo Communal administrations.

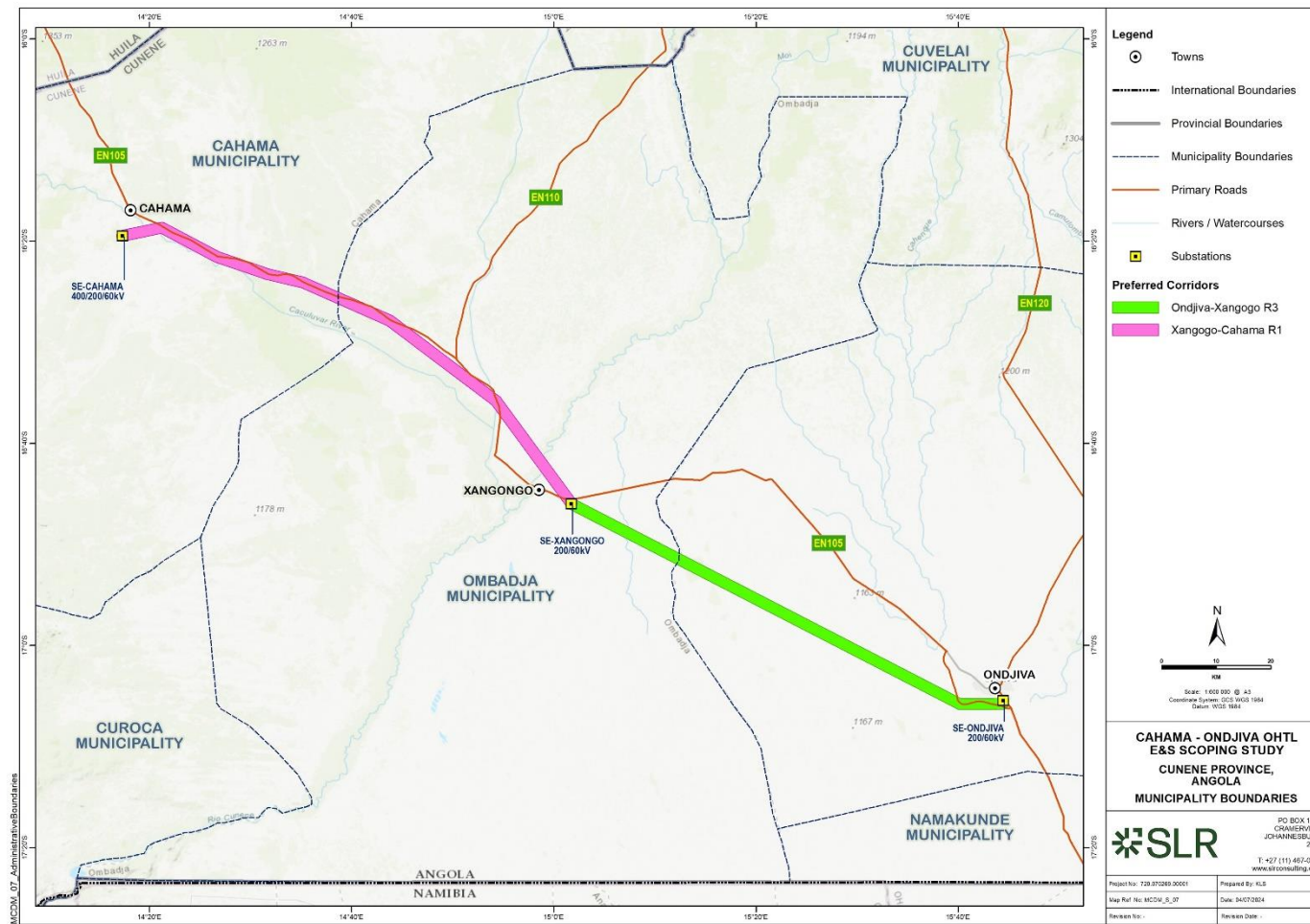


Figure 5-9: Administrative Boundaries

5.3.2 Demographic Profile

5.3.2.1 Population

The results of the latest Census conducted in Angola in 2014 reported that the population was approximately 25.8 million people⁴⁹. Based on projections it is estimated that in 2022 the overall population would have increased in approximately 35.6 million people⁵⁰.

The population figures for the Cunene Province and in the municipalities through which the OHTL will be routed is summarised in Table 5-14 which further shows the estimated population for the year 2024, as it is the last projection made per municipality.

Table 5-14: Population in the Project Area⁵¹

Administrative Area	Population					
	Census 2014 ⁵²			Estimated for 2024 ⁵³		
	Total	Males	Females	Total	Males	Females
Cunene Province	990 087	462 056	528 031	1 353 118	646 848	706 270
Cuanhama	375 995	174 277	201 719	511 781	242 990	268 791
Onbadja	306 158	141 679	164 479	416 709	197 540	219 168
Cahama	70 336	32 865	37 471	95 753	45 822	49 930

In terms of population density Angola has an average of 26.42 people/km². Cunene Province has a significantly lower density (16.1 people/km²). At municipal level Cahama, with 9.27 people/km² is the most sparsely populated, the Cuanhama Municipality has a similar population density to the national average, with 23.46 people/km² while Ombadja Municipality is more densely populated with 31.84 people/km².

5.3.2.2 Age and Gender Breakdown

Based on the demographic data for Cunene Province, the population distribution by age groups is explained. The 0-14 years age group within the Cunene Province constitutes a significant portion of the population (48%), reflecting a youthful demographic. This high number indicates a high birth rate and potentially a growing population and a potential for a high demand of services in the future. The 15-64 years group represents the working-age population and while covering a larger age range accounts for the same proportion (48%) of the population as the 0-14 age group. This group is critical for the labour force and economic productivity of the Province. The relatively balanced number of people in this category compared to the younger age group indicates a stable labour force capable of supporting economic activities, including agriculture, commerce, and services. Finally, as the +65 year is significantly smaller (4%) compared to the other groups, reflects a lower life expectancy and possibly higher mortality rates at older ages. This demographic segment may require targeted healthcare services, social support systems, and pension schemes to support the elderly population. The small size of this group also suggests less of a burden on working-age individuals in terms of elderly care compared to regions with higher proportions of elderly citizens.

⁴⁹ INE, 2016

⁵⁰ Angola | Data (worldbank.org)

⁵¹ INE, 2018

⁵² INE, 2016- Final results from the 2014 Census

⁵³ INE, 2018 - Population Projections - Cunene Province

In relation to the gender distribution, as it can be seen in Figure 5-10 and Figure 5-11, Cunene Province in 2014 had 47% males and 53% females. The projections for the Province suggest that this will change to a slight increase of the percentage of males (48%) in relation to females (52%), which can be explained, partially, by the fact that the conflicts and war in Angola ceased in 2002, reducing the mortality in men.

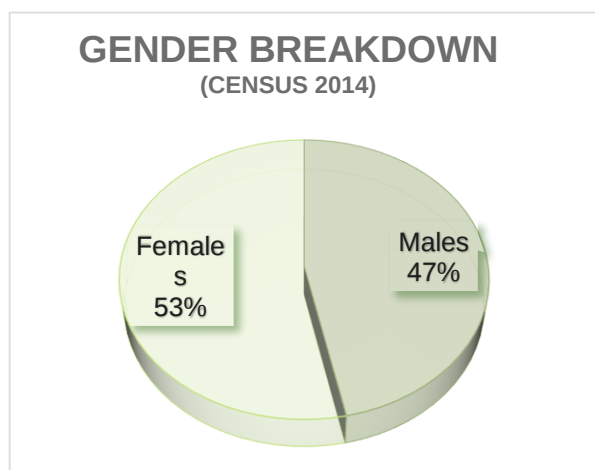


Figure 5-10: Gender Breakdown (2024)⁵⁴

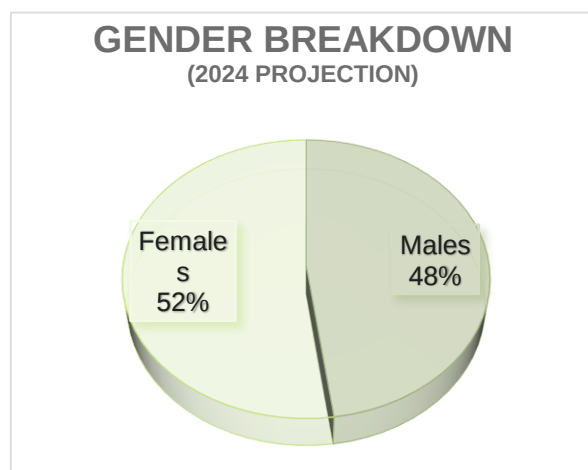


Figure 5-11: Gender Breakdown (Projected)⁵⁵

5.3.2.3 Education and Literacy

According to the WBG⁵⁶, adult literacy rate is the percentage of people ages 15 and above who can both read and write with understanding. In Angola, the adult literacy rate stands at 71.1%, with 82% among males and 60.7% among females⁵⁷.

In Cunene Province, the literacy rate is reported to be well below the national average with approximately 53.8% of the population over the age of 15 classified as literate. Within the study area, the literacy rates vary significantly: The Cuanhama Municipality, which houses the provincial capital, boasts the highest literacy rate at 77%, reflecting greater access to educational opportunities and a broader range of socio-economic services within the urban centres. Comparatively, in Ombdja Municipality, the literacy rate stands at 50% and in Cahama Municipality, it is notably lower at 31%⁵⁸. A comparison between the literacy rate in Angola and across the Project area is provided in Figure 5-12.

⁵⁴ INE, 216; INE, 2018

⁵⁵ Ibid.

⁵⁶ World Bank Group Data Bank. Available at: <https://databank.worldbank.org/metadataglossary/millennium-development-goals/series/SE.ADT.LITR.ZS>

⁵⁷ INE, 2016

⁵⁸ Population of the major cities in Angola. Available at: <https://www.citypopulation.de/en/angola/cities/>

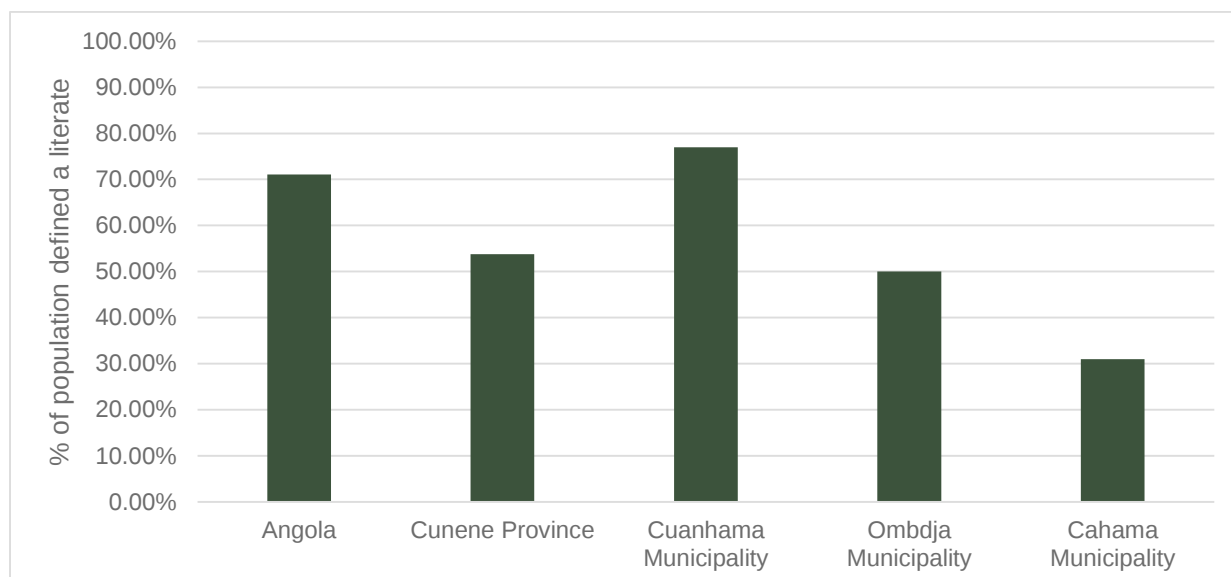


Figure 5-12: Literacy Levels within Angola and the Project Area

5.3.2.4 Dependency Ratio

According to the World Bank, the dependency ratio is the ratio of dependents (people younger than 15 or older than 64) to the working-age population (ages 15-64). This indicator provides insight into the age structure of a population and the potential burden on the economically active segment of society.

The total dependency ratio for Angola sits at 91.5, with that of youth being 86.5 and of the elderly being 5.0⁵⁹. This ratio indicates a relatively high dependency burden on the working-age population, which can impact factors such as social services, healthcare, pensions, and economic productivity.

5.3.3 Economic Indicators

5.3.3.1 Economic Sectors and Household Income

The primary sector, specifically agriculture and livestock production, is the largest economic sector within the Project area. This sector provide communities with their main sources of food supply and income and is of fundamental socio-economic importance, which is practiced by the vast majority of rural households.

Crop production is the main agricultural activity along the banks of Cunene River within the Ombadja Municipality, where there are more productive soils. Typically, three methods of cultivation are practiced: (i) individual, on small farms (traditional peasant families); (ii) collective, on small and medium farms (peasant associations or co-operatives); or (iii) corporate, on large farms.

The largest portion of agricultural activity is practiced on individual and collective farms, where land is cultivated in a rudimentary manner. The production system, mainly under rainfed conditions, is composed of cereals that are more resistant to irregularities of rainfall, such as massango, massambala and maize, as well as certain varieties of beans in areas with higher rainfall. Production is generally for self-consumption and, when there is a surplus, this is used

⁵⁹ Angola: People and Society. Available at: <https://www.cia.gov/the-world-factbook/countries/angola/#people-and-society>

for informal trade. To a lesser extent, corporate farming is still underdeveloped in the Project area, and is generally concentrated where irrigation is possible, including along the banks of the Cunene River in the Ombadja Municipality. Commercial farming is primarily the cultivation of fruit and vegetables including beans, potatoes, and citrus.

Livestock farming, in particular cattle farming, is another important agricultural activity within the Project area. In areas of crop production, livestock farming is considered a complementary resource, however, as one moves to more semi-arid areas with it becomes more important. In these areas (included in the region of sweet grass pastures), livestock farming is the main, if not exclusive, activity, with agriculture becoming a marginal activity, practised only when weather conditions allow and based on less demanding cereal varieties in terms of water requirements, such as massango and massambala.

Livestock production is mostly practised by individual traditional farmers, to whom the cattle is seen as an economic reserve. The cattle are seldom sold unless families are under great economic pressure, or the animals are sick. Livestock production of small animals is seen as complementary activity to cattle breeding, and these animals are sold or exchanged for other products (such as food supplements like cereals). The grazing system applied by these traditional farmers is based on seasonal migration of farmers with their animals over long distances (transhumant grazing), in search of areas with better grazing and water resources and remaining there whilst pasture and water resources allow. Commercial livestock farming is underdeveloped in the Project area and is practiced only on large farms under intensive grazing systems, located mainly in Cahama.

Climate change impacts, such as increasing temperature, increased evaporation, variable rainfall with a shorter more intense season and flash floods, and associated hydrological and geohydrological implications, can have direct consequences on agriculture. Periodic droughts cause considerable stock losses and reduce grain production. Impacts on household food security in the subsistence farming areas, is therefore a significant consequence of climate change.

There is little formal industry in the Project area with the only activities taking place in Ondjiva city. Commercial activities within the study area are generally of an informal nature, practices in local markets and adjacent to roads. This type of trade is the main means of supplying goods to rural households. Most formal commerce is located in municipal and communal settlements, especially wholesale and retail trade.

5.3.3.2 Employment

According to the Census 2014, of the total 516 662 inhabitants aged 15 and over within Cunene Province, 193 684 were economically active (i.e., employable / in the labour force), 153 628 of whom were employed and 40 056 unemployed (Table 5-15).

Table 5-15: Employment Status of Population aged 15 years and Older⁶⁰

Activity status	Total	Male	Female
Population aged 15 years and older	516 662	228 435	288 227
Economically active population	193 684	96 740	96 944
Employed	153 628	75 245	78 383
Unemployed	40 056	21 495	18 561

⁶⁰ INE, 2016

The employment rate is 29.7% (when considering all potentially economically active people), which is lower than the Angola's employment rate of 40%. Employment is higher among males (32.3%) and in urban areas of the Those who are employed are mostly male (32.3%) and in urban areas of the Cunene Province (40.4%)

In 2014, the primary sector employed the largest portion (63.5%) of the labour force, mostly in agriculture and livestock production. The primary sector was followed by the tertiary sector (18.0%) and lastly, the secondary sector employed only 3.8% of the active population (mainly in construction).

The 40 056 unemployed individuals corresponded to an unemployment rate of 20.7%, which is lower than the Angolan unemployment rate of 24.2%.

5.3.3.3 Poverty

Although disaggregated information is not available for the study area, the Multidimensional Poverty Index (MPI) of the province allows an approximate portrayal of the poverty situation of the study area to be extrapolated. This index goes beyond a family income-based perspective, being defined according to ten indicators, each one competing similarly for the three aspects considered, namely health, education and living standards.

With an MPI of 0,420 (in a scale from "0 – no poverty" to "1 – extreme poverty"), in 2018, Cunene Province was considered vulnerable to poverty, being one of the worst faring provinces in the country. Within the Cunene Province, 71,9% of the of the population is considered multidimensionally poor, while 50,8% of the population live in severe poverty (Table 5-16).

Table 5-16: Multidimensional Poverty Index⁶¹

Province	MPI	Incidence of poverty (%)	Intensity of deprivation (%)	Severe poverty (%)
Bengo	0,332	62,6	53,1	38,3
Benguela	0,332	59,6	54,1	35,2
Bié	0,475	80,8	58,8	57,9
Cabinda	0,154	31,0	49,6	14,1
Cuando Cubango	0,420	74,7	56,2	50,5
Cuanza Norte	0,330	62,6	52,8	37,3
Cunene	0,420	71,9	58,4	50,8
Huambo	0,376	66,5	56,5	45,4
Huíla	0,402	68,7	58,5	48,1
Luanda	0,074	16,0	46,3	6,0
Lunda Norte	0,432	76,2	56,6	51,7
Lunda Sul	0,355	67,8	52,3	43,3
Malanje	0,339	61,3	55,3	39,8
Moxico	0,425	75,9	55,9	51,1
Namibe	0,275	50,0	55,0	31,9
Uíge	0,391	73,2	53,5	47,9

⁶¹ OPHI, 2019

Province	MPI	Incidence of poverty (%)	Intensity of deprivation (%)	Severe poverty (%)
Zaire	0,216	46,4	46,6	21,0

5.3.4 Access to Services

5.3.4.1 Electricity

The low capacity of generation, transmission and distribution of electricity makes it hard for the national supply to meet demand. In the Project area, the electricity supply service is unreliable, with recurrent interruptions and, in certain cases, is of a limited duration (i.e., only a few hours a day).

The electricity from the electric network benefits the urban areas of Xangongo and Ondjiva. In the case of Cahama and other communal headquarters within the Project area, the access to electricity is through a set of diesel generators, under the control of the respective municipal administrations, and is generally limited to a restricted period at night, usually between 18:00 and 22:00⁶².

5.3.4.2 Water

Where existing, the distribution of water to municipal and communal headquarters is essentially carried out through small community-managed supply systems. The exception to this is Ondjiva city centre, where water is supplied *via* the water supply system that is managed by the Cunene Water and Sanitation Company. In rural areas, access to water is mainly at public fountains and wells, which have been built and/or rehabilitated under the “Water for All” Programme⁶³.

5.3.4.3 Sanitation

The majority of the population in Cunene Province has no access to sanitation, as 90.3% of the families, 169 087 out of 187352, have no sanitation infrastructure. This rate is even higher in rural areas where 98,3% of the population, 141 651 families of a total of 144 085, have no access to sanitation⁶⁴.

5.3.4.4 Healthcare

Cunene Province has a high death rate, with the number of deaths per 1 000 inhabitants at 11,6⁶⁵. The high death rate can be attributed to water and hygiene-related diseases (malaria, acute dysentery, typhoid fever), infectious diseases (tuberculosis) and Sexually-Transmitted Diseases (STDs - HIV/AIDS).

In 2019 the healthcare network in Cunene Province was composed of one provincial hospital, 10 municipal hospitals, six health centres/clinics and 62 health stations / rural clinics⁶⁶. The distribution of the latter reflects unequal access to specific healthcare, in the sense that major health units (hospitals) are only located in municipal headquarters. This implies that the patients who need more intensive care often have to travel long distances to receive proper treatment.

⁶² Environmental and Social Impact Assessment (ESIA) Report for the Angola – Namibia Transmission Interconnector Project (ANNA), Aurecon/Zutari, 2020

⁶³ ESIA ANNA, 2020

⁶⁴ INE, 2016

⁶⁵ Ibid.

⁶⁶ Ministério da Saúde - GEPE, Anuário de Estatística Sanitária, 2019

The population per health centre and per health station ratio (0.06 unit/000hab.) indicates a shortage of primary health care facilities to fulfil the needs of the communities, which is exacerbated by difficult accessibility, lack of medicines and human resources.

5.3.5 Overview of Urban Centres within the Project Area

While people residing in urban areas in Angola in 2014 accounted for 62.5% (16 153 987 inhabitants) of the total population in 2014, within the Cunene Province, people residing in urban areas only accounted for 20.9% of the provincial population. As for the municipalities in the Project area, Cuanhama had 121 537 urban inhabitants (32.5%), Cahama 12 767 people (18.2%) and Ombadja 37 617 urban residents (12.3%), illustrating the rural nature of the Project area.

Ondjiva city, in Cuanhama Municipality, serves as a major administrative, economic, and cultural centre. Situated at an elevation of 1 098 meters and spanning an area of 2 100 km², Ondjiva, the capital of Cunene Province, is a crucial administrative, economic, and social centre for the region⁶⁷. The City has experienced substantial growth and development, especially following the civil war, as it continues to rebuild and modernise its infrastructure.

Ondjiva exhibits a variety of settlement types, ranging from traditional rural homesteads to more urbanised structures within the city centre. The settlement patterns can be broadly categorised into the following:

- **Urbanised Areas:** The city center features modern, urbanised settlement types. Residential areas include single-family homes, apartment buildings, and newer housing developments aimed at accommodating the growing urban population ⁶⁸.
- **Commercial and Public Services Zones:** The commercial zones of Ondjiva include markets, small businesses, and shops that cater to both local residents and visitors from surrounding areas. Public services are well-represented, with numerous schools, healthcare facilities, administrative buildings, and other essential services.
- **Informal Settlements:** Like many growing cities in developing countries, Ondjiva has areas of informal settlements, typically characterised by makeshift housing constructed from a variety of materials without formal planning or access to basic services. These areas often reflect the rapid urbanization and the influx of people seeking better opportunities in the city.
- **Traditional Rural Homesteads:** Typically found on the outskirts of Ondjiva and in the surrounding countryside. They consist of simple, often circular huts made from local materials such as mud and thatch. The layout usually includes multiple huts for different functions (sleeping, cooking, storage) grouped around a central yard.

Notable for agriculture and trade, Xangongo, the capital of Ombadja Municipality, serves as a market hub for agricultural products and goods, supporting local food security and economic stability through initiatives in infrastructure, education, healthcare, and sustainable development.

Xangongo is strategically located near the Cunene River, a geographical feature that has profoundly shaped the settlement's development, economy, and cultural practices. The river acts as a natural boundary and essential resource, supporting irrigation and livestock farming, which are vital to the local economy. The river's strategic importance has driven infrastructure developments such as bridges and water management systems, crucial for connectivity and flood control. These developments have improved the town's accessibility and integration into larger economic networks within Cunene Province and beyond.

⁶⁷ Population of the major cities in Angola. Available at: <https://www.citypopulation.de/en/angola/cities/>

⁶⁸ Rodrigues, C. U. (2007). *From family solidarity to social classes: Urban stratification in Angola (Luanda and Ondjiva)*.

Xangongo's location near the Cunene River significantly influences its settlement patterns. The settlement patterns can be broadly categorised into the following:

- **Urbanised Residential Areas:** Located closer to the city centre and along more stable sections of the riverbank; these areas are characterised by modern housing developments including single-family homes and apartment buildings. Due to their proximity to the river, residents benefit from flood management systems and infrastructure.
- **Commercial Zones:** Predominantly in the city centre, with some businesses situated along the river to facilitate trade and transportation; the commercial zones serve as vibrant trading hubs where agricultural products from surrounding rural areas are bought and sold.
- **Traditional Rural Homesteads:** These homesteads are typically located further from the river to mitigate the risks of flooding while still being close enough to access water for agricultural purposes and daily needs. They are primarily characterised by circular huts made from locally sourced materials such as mud and thatch and multiple structures within a single homestead for different purposes, such as living quarters, storage, and animal shelters.

Known for its agriculture and natural resources, Cahama focuses on subsistence agriculture, including staple and cash crops like maize, millet, sorghum, cotton, and tobacco. Cahama is a significant urban centre in Cunene Province. Like many towns in this region, its settlement patterns have been shaped by historical, economic, and geographical factors. The City's development has been influenced by its strategic location along key transportation routes, making it a vital hub for trade and movement within the Province.

The settlement patterns can be broadly categorised into the following:

- **Urban Core:** The urban core of Cahama includes a mix of traditional houses and modern buildings. The housing density tends to be higher in the central areas, with more organized layouts and infrastructure. Central Cahama hosts markets, shops, and businesses that cater to the daily needs of the residents. This area is a hub for economic activities and social interaction.
- **Peripheral Urban Areas:** As you move away from the city centre, housing becomes less dense, with more space between structures. These areas often have a mix of formal and informal settlements. Many residents in the peripheral areas engage in subsistence farming. These plots are crucial for food security and are often located near the farmers' homes.
- **Informal Settlements:** Rapid urbanisation and migration have led to the development of informal settlements. These areas typically lack adequate infrastructure and services, and houses are often built from temporary materials.

5.3.6 Potentially Vulnerable Persons or Groups

Potentially vulnerable persons or groups are those with an increased likelihood of being adversely affected by the Project, as well as those who, due to their circumstances, may be more limited than others in their ability to take advantage of a project's benefits.

5.3.6.1 Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities

The WB ESS 7 recognises that Indigenous People / Sub-Saharan African Historically Underserved Traditional Local Communities have identities and aspirations that are distinct from mainstream groups in national societies and often are disadvantaged by traditional

models of development. In many instances, they are among the most economically marginalised and vulnerable segments of the population.

In Angola, 25 000 people, or 0.1% of Angola's population, belong to the San and Otjiherero-speaking semi nomadic pastoralists⁶⁹. In 2016, funding of smaller non-governmental organisations (NGOs) working with Indigenous People, was reduced, and some organisations closed as a result. In the same year, land expropriation for tourism development, commercial logging, and national projects were undertaken, affecting indigenous peoples' settlements. There are no specific references to Indigenous Peoples or minorities in the Constitution, nor in other domestic law. The Government of Angola does not recognise the concept of indigenous peoples, as affirmed in international law⁷⁰.

Both ethnolinguistic groups are present in the Project area, namely in Cuanhama and Onbadja municipalities and, as such, in the ESIA phase, it will be necessary to assess whether the OHTL corridor will affect directly or indirectly any Indigenous People / Sub-Saharan African Historically Underserved Traditional Local Communities. If this happens then an Indigenous People / Sub-Saharan African Historically Underserved Traditional Local Communities Plan will have to be put in place, alongside with the project's Stakeholder Engagement Plan (SEP).

5.3.6.2 Gender Considerations

Women in Angola continue to experience pervasive gender and intra-household inequalities. Increasing women's economic activity outside the home has not reduced the volume of unremunerated work required to be done in the home. This contributes greatly to increasing their workload, making it difficult to care for children, amongst other duties.

Also important are the obstacles faced by women with regards to HIV/AIDS. There is a high concentration of infection in women of childbearing age (over half of the HIV/AIDS cases are found in women), and they are twice-discriminated against by their partners, first as women and then as women with HIV/AIDS (often being banished from their homes). In rural areas, women with HIV/AIDS face additional problems over and above the high incidence of poverty, namely that treatment in the retroviral program is often abandoned, particularly as a result of the poor availability of health services⁷¹.

Furthermore, women are also susceptible to Gender Based Violence (GBV), an umbrella term that covers a range of behaviours, including sexual, physical, psychological and economic abuse. What sets it apart from other types of violence and harassment is that it is directed at people because of their sex or gender, or disproportionately affects people of a particular sex or gender.

5.3.7 Human Rights

Since the end of its civil war in 2002, Angola has experienced notable progress alongside its ongoing challenges. The country has embarked on several positive developments that mark significant strides in its post-war recovery and growth.

The rights and fundamental freedoms of Angolan citizens are safeguarded by the constitution. There are various legal frameworks in place for the protection of human rights at the national level, along with international treaties that have been incorporated into the domestic legal system.

There have been advancements in human rights, particularly in the areas of health and education. The Government has invested in expanding access to education and healthcare,

⁶⁹ IWGIA, 2011

⁷⁰ FAS, 2017a

⁷¹ European Union (2014). *Diagnóstico de Género de Angola. PAANE II – Programa de Apoio aos Actores Não Estatais*.

aiming to improve the overall quality of life for its citizens. The introduction of free and compulsory education for the first six years and efforts to increase literacy rates are positive steps towards human capital development⁷². Additionally, Angola has seen improvements in healthcare infrastructure, with increased access to medical services and initiatives aimed at reducing maternal and infant mortality rates⁷³.

5.3.8 Cultural Heritage

Angola has one proclaimed World Heritage Site in the north, close to the Congolese border. There are eight other proposed sites, of which six are within Luanda itself, with none located close to the Project site.

The following sites located within the municipalities included in the Project area have been identified through desktop research⁷⁴:

- **Forte Roçadas** – located in the town of Xangongo, Forte Roçadas is a historic fortress built by the Portuguese in the late 19th century. It served as a defence post during colonial times. Today, it stands as a reminder of the region's past and offers an interesting glimpse into Angola's history. Exploring the fort and its surroundings provides insights into the colonial era.
- **King Mandume Memorial** – located 42 km from Ondjiva, in Namacunde. It houses the remains of the last king of the Kwanyama. The memorial is surrounded by logs that symbolise the heroic deeds of this people in the fight against Portuguese colonialism. A tourist resort has been built on this memorial.
- **Ombala Grande** – this is where the 11 kings of the region lived and are buried, except for King Mandume who, because he wasn't circumcised at the time, lived and died in another embayment.
- **Vau-do-Pembe Monument** – the monument is in memory of the Portuguese colonialists who died crossing the Cunene River while facing resistance from the local inhabitants.
- **Mufilo Monument** – located in the south of Xangongo, this is the landmark of the great battles fought by King Mandume, assisted by King Tchetekela of Cuamato, against the Portuguese colonial regime.
- **Colossal** – the world's largest baobab tree is located in the Municipality of Ombadja, in the village of Péu-Péu.

During the impact assessment phase, the exact location of these sites as well as the location of other, non-classified culturally significant places such as graves and burial sites, archaeological sites, ceremonial sites or "places-of-power", paleontological sites and conflict sites will be identified.

⁷² <https://www.hrw.org/news/2022/11/10/human-rights-agenda-angola>

⁷³ Amnesty International

⁷⁴ <https://www.jornaldeangola.ao/ao/noticias/cunene-provincia-tem-14-monumentos-e-sitios-historicos-classificados/>; <https://comovente.com/explorando-as-maravilhas-da-provincia-do-cunene-uma-jornada-de-descoberta/>

6.0 Stakeholder Consultation, Participation and Disclosure

6.1 Overview

Stakeholder engagement is a process that is designed to enable all stakeholders to voice their opinion and/or concerns in respect of a project. This includes all project affected people, interested parties, technical specialists, and the various relevant organs of state.

Stakeholder engagement is an on-going process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and on-going reporting to affected communities.

Stakeholder engagement will commence during the E&S Scoping Study and will continue during the ESIA phase.

6.2 Stakeholder Identification, Analysis and Mapping

The stakeholder groups can broadly be divided into stakeholders whom:

- Are directly and/or indirectly affected by the Project (or the RNT's operations);
- Have "interests" in the site, Project or RNT; and
- Have the potential to influence project outcomes or company operations.

To determine appropriate engagement, communication and interaction methods, stakeholder groups were identified and assessed according to their interest and potential to be affected by the Project.

Table 6-1: Key Stakeholder Groups Identified

Group	Organisation
Government Agencies	Ministry of Energy and Water
	Ministry of Environment
	Rede de Transporte de Electricidade
	Gabinete de Administração da Bacia Hidrográfica do Cubango, Cunene e Cuvelai (GABHIC)
Local Authorities / Municipalities / Districts	Provincial Government of Cunene
	Cahama Municipal Administration
	Ombadja Municipal Administration
	Cuanhama Municipal Administration
	Provincial institutes: IDF & IDA
Businesses	Agricultural Farms
Communities	Local chiefs
	Communities along the route alignment
Interested Parties	Programa de Fortalecimento da Resiliência e da Segurança Alimentar e Nutricional em Angola (FRESAN)
	Higher Education Institutions
NGOs	Development Workshop (DW)
	Action for Rural Development and Environment (ADRA)
	Ajuda de Desenvolvimento de Povo para Povo (ADPP)

Based on the assessment, the stakeholder engagement approach will be determined for each group, as illustrated in Figure 6-1.

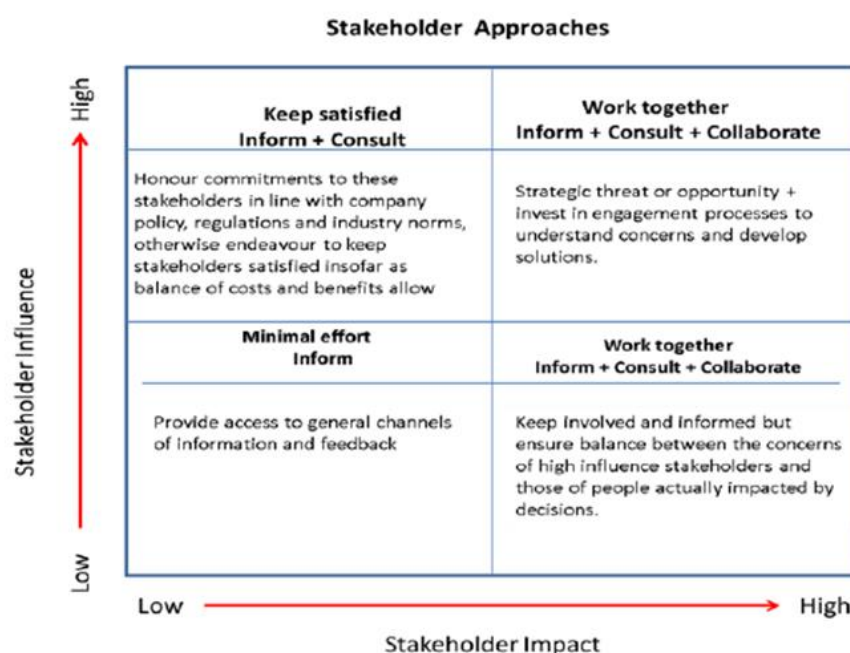


Figure 6-1: Stakeholder Engagement Approaches

Stakeholder identification and mapping will be ongoing throughout the ESIA process, but preliminary stakeholder mapping and analysis is presented in Table 6-2.

Table 6-2: Key Stakeholder Groups and Approach

Category	Level of Influence	Degree Affected	Approach	Engagement Method
Local Communities	High	High	Work together	Individual meetings
Local Authorities	Medium	Low	Inform	Invitation to public meetings
Government Agencies	High	Low	Keep, informed	Individual meetings
Interested parties	Low	Low	Inform	Invitation to public meetings
NGOs	Low	Low	Inform	Invitation to public meetings

6.3 Scoping Study Engagement

The scoping phase stakeholder engagement will include the following:

- Distribution of a background information leaflet (in Portuguese) to stakeholders in the vicinity of the Project; and
- Informal key stakeholder interviews.

The consultations will involve mainly individual in-person meetings with each of the stakeholders.

6.4 Next Steps

Stakeholder engagement during the ESIA must conform to the requirements of the Angolan legislation and be developed following principles of GIIP and in line with the requirements of IBRD ESSs.

Although not all ESSs are applicable in this Project, the common pursuance of informed consultation and participation will be applied throughout the Project. This is expected to be carried out through interviews, focus group discussions, workshops / meetings and public announcements with the following broad categories of stakeholders:

- Affected community residents (inclusive of vulnerable groups);
- Government and institutional stakeholders; and
- Regulatory Authorities.

The primary aims of the stakeholder engagement process are to:

- Inform stakeholders of the Project and the ESIA underway;
- Initiate meaningful and timeous participation of stakeholders;
- Identify issues and concerns of stakeholders with regards to the application for the Project (i.e., focus on important issues);
- Promote transparency and an understanding of the Project and its potential E&S impacts (both positive and negative);
- Provide information used for decision-making;
- Provide a structure for liaison and communication with stakeholders;
- Ensure inclusivity (the needs, interests and values of stakeholders must be considered in the decision-making process);
- Focus on issues relevant to the Project, and issues considered important by stakeholders; and
- Provide responses to stakeholder queries.

As part of this ESIA, the Project AoI will need to be confirmed at the commencement of the ESIA phase in line with the ESS 1.

Communities that surround the Project footprint will be invited to “inform and be informed” about developments in order to achieve the most positive impacts possible. It is also noted that engaging stakeholders even before projects commence can achieve the best results. It is for this reason that the stakeholder engagement process that forms part of the ESIA becomes the basis of a long-term stakeholder engagement process.

7.0 Potential Environmental and Social Risks and Impacts

7.1 Overview

This Section identifies and considers potential E&S impacts of the Project and is an important step in understanding and improving E&S performance associated with the Project as well as informing the ToR for the ESIA (**Section 9**).

It is important to note that the potential impacts summarised in Table 7-1 and Table 7-2 are a preliminary list for the purpose of this draft E&S Scoping Report and will be verified and, where necessary, updated with input from project specific specialist studies. During the ESIA phase each impact listed below, and any additional impacts identified during the ESIA, will be assessed considering the findings of project specific specialist studies.

The construction and operational phases of the Project are considered in the subsequent sections and mitigation measures have been proposed (albeit at a high-level) to enable the Project to meet the local regulatory requirements. Decommissioning has not been considered as the OHTL is expected to be in operation for the next 40 years.

The risk / aspect and impact identification are consistent with the internationally accepted mitigation hierarchy Figure 7-1. The mitigation hierarchy is used to avoid or prevent impacts, or where avoidance is not possible, minimise and finally to rehabilitate or offset / compensate impacts to workers, communities, and the environment. For positive impacts enhancement measures have been proposed

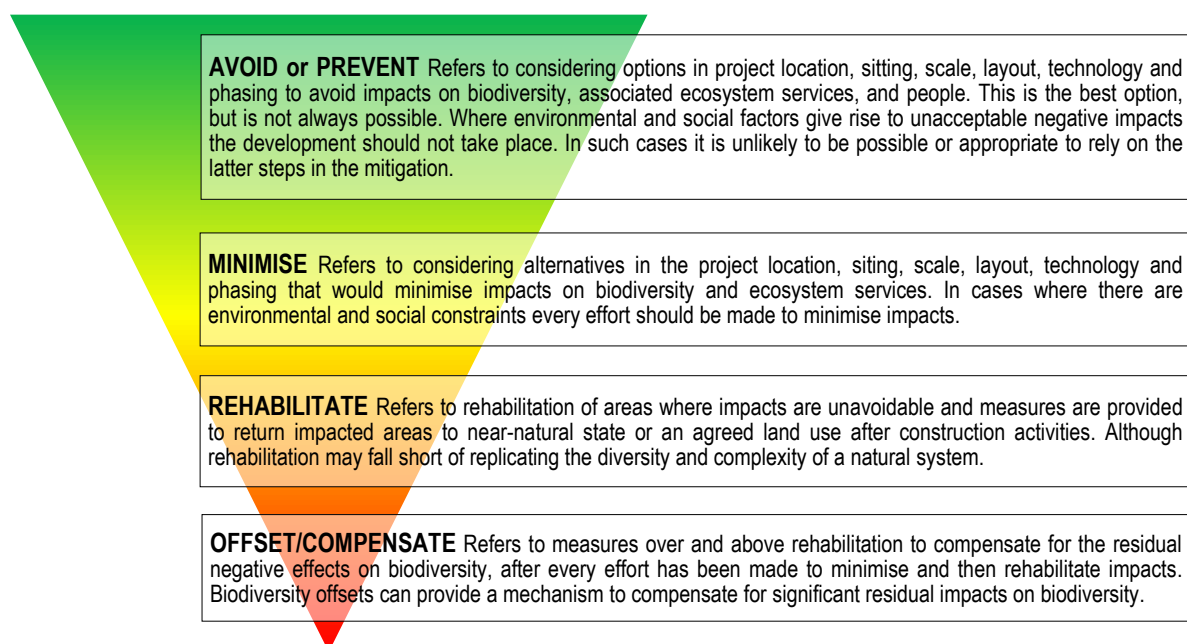


Figure 7-1: Mitigation Hierarchy

7.2 Pre-construction and Construction Phase Risk Impacts

Table 7-1: Pre-Construction and Construction Phase Risks / Aspects, Impacts, Mitigation and Recommendations

Risk / Aspect	Impact	Mitigation and/or Recommendation
Ecology & Avifauna		
Floral habitat destruction / disturbances including Species of Conservation Concern (SCC)	- Construction activities are expected to be of a relatively small footprint to accommodate pylons and associated facilities so direct impacts are expected to be minimal but may include vegetation removal, habitat destruction or disturbances. - Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc.	- Minimise the RoW and project's footprint in areas of high sensitivity. - Relocate pylons in areas of high sensitivity.
Faunal habitat destruction	- Direct and permanent loss of natural fauna habitat within the RoW the construction phase. - Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction. - Birds are disturbed and displaced from the Project site and surrounding areas due to construction activities and associated noise etc. - The removal and/ or destruction and/ or alteration of habitat used by birds, may impact on the foraging and/ or breeding success of certain species, and will lead to numerous birds being displaced from the Projects site and needing to find suitable available habitat elsewhere.	- Undertake Ornithological Surveys to understand impacts. - Prepare a Biodiversity Management Plan (BMP) as part of the ESMP – during the ESIA phase. The BMP should recommend appropriate mitigations such as: - Avoiding construction activities during the nesting season. - No wild animal may under any circumstance be hunted, snared, captured, injured, killed, harmed in any way. - Avoid unnecessary elevated noise levels to avoid faunal disturbances. - Avoid littering to prevent attracting fauna to site. - Prohibit fires (<i>queimadas</i>).
Soils & Water Resources		
Site preparation activities	Soil degradation through erosion and contamination can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction-related land surface disturbance.	Establish erosion control barriers and return disturbed surfaces to pre-construction conditions.
Storage of fuels and chemicals, construction camp establishment, maintenance of equipment and vehicles	Hydrocarbon spillages from construction activities can contaminate soil and water resources.	- Provision of secondary containment (e.g., bunds), drip trays or other overflow containment measures for hazardous material storage containers. - Equipment (e.g., spill kits) for dealing with spills of fuels / chemicals must be available at the site in suitable quantities. Spills must be cleaned up immediately and contaminated

Risk / Aspect	Impact	Mitigation and/or Recommendation
		soil / material disposed of appropriately at a registered / licensed site. • Prepare chemical management and waste management plans as part of the ESMP.
Inadequate stormwater management	• Surface water contamination (due to spillage of fuel, chemicals, dumping of construction material into or close to watercourses) and sedimentation. • Erosion of watercourses. • Alteration of drainage lines which may lead to ponding or increased run-off patterns.	• Management of stormwater on the site during and after construction must be undertaken in accordance with a stormwater management plan (SWMP). • Run-off generated from cleared and disturbed areas / slopes that drains into watercourses must be controlled using erosion control and sediment trapping measures like silt fences and sandbags.
Working in or in close proximity to watercourses e.g., unnamed drainage line	• Impacts associated with the construction activities include potential encroachment of the proposed development into watercourses. • The potential loss of biodiversity as a result of construction-related activities within the watercourses. Decrease in the provision of watercourse ecoservices due to the potential degradation of the watercourses. • Damage and/or removal of vegetation as part of an edge effect leading to a loss in freshwater ecological habitat.	• The Project footprint, in terms of watercourse crossings, must be limited as much as possible (this includes clearing of vegetation which must be restricted to what is essential). • Construct temporary silt traps at drainage points to allow sediment settlement from run-off. • Edge effects (impacts on areas beyond the construction footprint due to ineffective care and management) during construction need to be strictly controlled through ensuring good housekeeping and strict management of activities near the riparian areas. • Existing roads should be used as far as practical to gain access to the sites and crossing the watercourses in areas where no existing crossing is apparent, should be avoided, but if it is essential, crossings should be made at right angles. • All disturbances caused by the construction activities must ensure that all alien vegetation is eradicated, and that ongoing alien vegetation control is implemented.
Noise / Air Quality / Waste / Traffic		
General construction activities	• Increase in noise pollution from site preparation, earthworks, construction vehicles and construction staff. Although there are no sensitive receptors in close proximity to the works.	• All mobile plant and equipment must be regularly maintained to ensure their integrity and reliability.
	• Ambient pollutant concentrations and nuisance dust-fall rates may increase during the construction period. The impact is likely to be localised near construction activities.	• Appropriate mitigation to be included in the ESMP including coverings on trucks, management of stockpiles, etc.

Risk / Aspect	Impact	Mitigation and/or Recommendation
	- Generation of waste (general and hazardous) and rubble during the construction phase. Builders' rubble, packaging and other waste generated in the construction process can contaminate wadis. - Generation and disposal of sewage waste from temporary construction toilets. - The increase in traffic, and especially of vehicles carrying heavy loads will cause an increase in deterioration of the road network.	- Suitable handling and disposal of waste protocols to be included in the ESMP Waste management hierarchy (reduce, re-use, recycle) to be followed. - Waste to be separated and stored in skips / bins and moved off site to suitable, licensed facilities to receive the waste. Proof of disposal must be retained. - Traffic management should be considered in the ESMP.
Health & Safety		
Health and safety risks (accidents and injuries working with hazardous substances, chemical exposure, noise, influx of people, etc.)	- Inconvenience and danger to proximate residents through increased road traffic, dust and noise, as relevant. - Contractor's staff safety during construction, especially working at heights or electrocutions.	- Develop a Community Health and Safety Management Plan as part of the ESMP. - The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the consequences of incidents.
Socio-Economic		
Potential loss of land or property	- Loss of land and associated land use opportunities due to Project infrastructure and restricted access. - Impacts on livelihoods due to the loss of access (either temporary or permanent) to agricultural land and / or grazing areas. - Impacts on livelihoods due to the loss of access (either temporary or permanent) to natural resources.	- As far as practically possible avoid areas of settlement and areas where economic activities, including subsistence agriculture, is taking place. - The proposed corridors are, however, routed through areas with human settlements as well as areas used for livelihood activities. In the event of physical and / or economic resettlement being required a Resettlement Action Plan (RAP) inclusive of livelihood restoration measures should be compiled in accordance with the relevant national legislation and World Bank requirements.
Employment opportunities	- Positive economic impact on the national, local, and regional economy through temporary job creation during construction. - There will also be an increase in the demand for services provided by local contractors e.g., security companies, transport companies, etc. - Indirect economic benefits will also be felt by local businesses selling goods and providing services required by project staff.	- Job creation expectations will have to be managed via management systems and communication mechanisms that regularly informs the local community (on-site and at local community centres) of the progress and job / skills needs at the development site. A formal job application process must be communicated (should this be a requirement). It is expected that the Contractor will have a Human Resource Procedure / Policy in place in order to respond to local labour legislation. - Expected employment opportunities will be communicated during the public consultation as part of the SEP.

Risk / Aspect	Impact	Mitigation and/or Recommendation
		A formal grievance management system should be put in place (and should remain in place throughout the life of the OHTL).
Presence of contractor workforce and influx of job seekers	- The presence of construction workers within local communities brings with them an increased risk of various antisocial social behaviour including: - Increased alcohol and drug abuse (due to higher wages of workers) - Increased incidence of prostitution and sexual exploitation - Increase in the spread of transmissible disease, etc. - Increased criminal activities associated with transient job seekers moving through the area. - The presence of construction workers can lead to an increase in conflict within the project area with local community members believing that people from outside of the area are taking jobs that should be reserved for themselves.	- Potential impacts are to be considered further in the social impact assessment which will include appropriate mitigation measures. - All project staff (including contractors) should undertake induction prior to commencing work on the project. The project induction should include training on HIV/Aids awareness, and policies on alcohol and drugs use. - Adopt a zero-tolerance approach to criminal activity. - Management plans to deal with contractor staff, contractor accommodation and relations with the local community should be compiled and included in the project ESMP. Possible management plans may include, but not be limited to, a Stakeholder Engagement Plan, Local Procurement Plan, Labour Force Management Plan, Indigenous People Plan (if applicable), Gender Action Plan, etc.
Gender based violence	- Women and girls are particularly vulnerable to impacts associated with the influx of construction workers. Projects with a large influx of workers may increase the demand for sex work and transactional sex. - An increase in alcohol and drug abuse also increases the risk of GBV and sexual exploitation. - The risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl may increase. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex. The risk of incidents of sex between laborers and minors, even when it is not transactional, can also increase. An increase in the use of alcohol and / or illegal drugs due to higher wages for workers in communities may further exacerbate incidents of GBV and sexual exploitation.	- Develop a Gender Action Plan. - Adopt a zero-tolerance approach to acts of GBV. - Undertake GBV awareness training with project staff (including contractors) as well as local communities. - Establish safe and culturally appropriate procedures for reporting on cases of GBV.
Cultural Heritage		
Loss of heritage and palaeontological resources	Loss of access to possible cultural heritage resources.	- A Heritage Assessment is required during the ESIA phase. - Intangible heritage must be considered by the social consultant during stakeholder interviews for the ESIA. - If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh

Risk / Aspect	Impact	Mitigation and/or Recommendation
		excavations, procedures of the national regulations must be followed. In addition, a Chance Find Protocol must be implemented by the responsible person in charge of the development.
Visual		
Loss of sense of place and visual intrusions	• Visibility and dust plumes generation at the construction sites.	• Apply construction-specific mitigations in the ESMP.

7.3 Operational Phase Risks and Impacts

Table 7-2: Operational Phase Risks / Aspects, Impacts, Mitigation and Recommendations

Risk / Aspect	Impact	Mitigation and/or Recommendation
Ecology		
Operation of OHTLs impacting avifauna	• Birds that depend on watercourses are likely to be impacted by the construction and operation of the OHTL. These watercourses serve as key habitats for various avifauna, providing essential resources such as food, nesting sites, and resting areas during migration. The installation of OHTL infrastructure can disrupt these habitats through direct habitat loss, increased risk of collisions with transmission lines, and potential changes to the hydrology of the area. Additionally, the construction activities may lead to disturbances and alterations in the water quality and availability, further affecting the biodiversity and health of these avian populations. As a result, careful consideration and implementation of mitigation measures are essential to minimise the adverse impacts on bird species dependent on these vital watercourses. • Therefore, key risks can be summarised as: ○ Bird trauma or mortality that is caused by collisions with OHTL. ○ Electrocutions. ○ The development forms a physical barrier to movement of birds across the landscape, alters migration routes and increases distances travelled and energy expenditure for hunting or foraging.	• Any new powerlines must be of a design that minimises electrocution risk by using adequately insulated 'bird friendly' structures, with clearances between live components of 2 m or greater and which provide a safe perch for bird.

Risk / Aspect	Impact	Mitigation and/or Recommendation
Climate Change		
Potential contribution of the Project to climate change and the OHTL's vulnerability to climate change	- The OHTL's performance may be affected by extreme weather events (e.g., increased temperatures, heavy rainfall and lightning) that may reduce the longevity of the infrastructure and could potentially result in an increase in maintenance costs. - The Project will contribute to the national GHG emissions mitigation target, through allowing for a more effective and reliable discharge of renewable energy from several ongoing renewable energy projects in Angola.	- A Climate Change assessment is recommended, that will: - Determine the resilience of the Project to climate change, taking into account how climate change will impact on its operation, through factors such as rising temperatures, diminishing water supply, and extreme weather patterns; and - Assess how these impacts may be avoided, mitigated, or remedied.
Health & Safety / Noise		
Health and safety / social ills	- According to the "IFC EHS Guidelines for Electric Power Transmission and Distribution" (IFC, 2007) noise in the form of buzzing or humming can be often heard around high voltage power lines producing corona noise – however noise produced by power lines does not carry any known health risks. In addition, such noise quickly dissipates with distance and is easily drowned out by typical background noises. - Inappropriate design of the OHTL could affect existing infrastructure and utility elements which could be a public safety concern for vehicles on the road, or inappropriate horizontal height of the transmission lines from other nearby OHTL lines which could also entail public safety concerns. - Potential exposure to Electric and Magnetic Fields (E-MFs)⁷⁵. Such an impact is related to public access of unauthorised personnel to the various Project components. Such access could result in safety issues such as unauthorised climbing of the transmission tower, which	- Noise impacts from the OHTL are expected to be negligible, and no further assessment of this impact is required during the ESIA. - E-MF exposure to be below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) limits. - Posters and warning signs in Portuguese regarding the dangers of the infrastructure and associated risks.

⁷⁵ E-MFs are radiation associated with the use of electric power such as household wiring, electric appliances and also from OHTL. Electric fields are produced from the voltage in the transmission line while magnetic fields are produced from the electric current. While electric fields can be shielded by objects (such as buildings or trees), magnetic field pass through most objects. Such fields are strongest at the source and decrease significantly with increasing distance from the source. Extensive scientific research and studies have been undertaken to address potential human health impacts from long term exposure to E-MF from transmission lines. The general consensus is that the overall scientific evidence for human health risk from E-MF exposure is weak, however, E-MF exposure could not yet be recognised as entirely safe.

Risk / Aspect	Impact	Mitigation and/or Recommendation
	could result in safety hazards (electric shock, thermal burn hazards and other).	
Visual		
Visual intrusions due to powerline structures	Change to the visual landscape.	Community engagement and thoughtful design can help balance functional needs with aesthetic concerns, ensuring that OHTL installations respect and enhance the visual character of the areas they serve.

7.4 Decommissioning, Closure and Rehabilitation Phase Risks and Impacts

The decommissioning phase is not expected to occur for some time. Typical risks / impacts are similar in nature to the construction phase and could include:

- Soil degradation and erosion for decommissioning;
- Soil and water contamination from spillage of fuels, lubricants and chemicals;
- Spread of alien invasive plant species.
- Nuisance dust fall from decommissioning activities;
- Increased noise and traffic from decommissioning activities;
- Waste generation and management from dismantled components; and
- Rehabilitation of previously disturbed areas.

7.5 Potential Cumulative Risks and Impacts

Other disturbances and sources of risk in the landscape can lead to increased mortality from OHTLs, this includes wind farms, oil infrastructure, water treatment facilities (which can attract migrants in close proximity to powerlines), and hunting and disturbance. Increase in road traffic due to other projects planned for the area including transmission lines and solar parks. Additional cumulative impacts will be identified and assessed in the ESIA.

8.0 Resettlement Scoping

8.1 Overview

Based on the nature and location of the Project, it is likely that people may lose access to land, assets or natural resources on a permanent or temporary basis. Consequently, some level of displacement is expected.

Physical displacement is the result of eviction, acquisition, rehabilitation, or demolition of property, or the expiration of covenants on rent- or income-restricted housing whilst economic displacement is the loss of assets (including land), or the loss of access to assets that results in the loss of income or means of livelihood.

As a result of the expected physical and economic displacement, there will be a need for land acquisition, compensation and livelihood restoration and physical resettlement of households or other infrastructure.

This chapter outlines the scope, approach, and key considerations for addressing resettlement issues related to the Project. The resettlement scoping is an initial step prior to the more detailed planning and analysis that will occur in the full Resettlement Action Plan (RAP) that will be developed once the final OHTL alignment is confirmed.

Through resettlement scoping key issues, preliminary scale of impacts, and preliminary strategies are identified to ensure that subsequent resettlement planning is comprehensive and well-informed.

The core objective of the resettlement process, from a project perspective, is to secure land access without compromising the livelihoods of PAPs. This objective cannot be met unless the process of planning land access and related resettlement is undertaken in a thorough and appropriate manner. More specifically, the objectives of early project planning are to:

- Ensure that all components of the land access and resettlement process are well planned, including assessment, stakeholder engagement, implementation, and monitoring and evaluation.
- Ensure that all relevant issues and risks are dealt with, and that the Project can secure access to land in a timely manner and within budget.
- Minimise land take to the extent possible, and avoid, or at least minimise, displacement to the extent practically possible.
- Ensure that displacement impacts are addressed in a manner that meets legal requirements and relevant good practice standards.

This resettlement scoping covers the following sections:

- An overview of the international guidelines on resettlement and a gaps analysis reviewing the fit between the laws and regulations relating to land acquisition and involuntary resettlement of Angola and the World Bank ESS requirements;
- A description of the land acquisition and likely categories of impact;
- Eligibility criteria for defining and entitlements for the various categories of PAPs; and
- A description of the process for preparing and approving resettlement and compensation plans.

8.2 Legal and Policy Alignment

Table 8-1 provides a summary of the comparison between Angolan and World Bank ESS on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement requirements.

Table 8-1: Gap Analysis between Angolan Legislation and World Bank ESS Requirements

Category	Angolan legislation	WB ESS 5
Eligibility	Land Law (Law No. 9/04 of 09 November) and Law on Territorial and Urban Planning (Law No. 3/04, of 25 June) both recognise the right to fair compensation for land users. The Law recognises the possibility of transmission of property over land classified as belonging to the State's private domain. Transmission of land property and acquisition of other rights over land is authorised to individuals or associations, both national and non-national. Private property rights are limited to urban land plots. Private ownership of rural land is not permitted. Also, and in principle, rights to land use and occupation, may not be issued in rural areas occupied by rural populations. Compensation involving those who have legal titles and customary rights to communal lands.	WB ESS5 identifies persons eligible for compensation and/or resettlement assistance to include persons who: • have formal legal rights to land or assets; • do not have formal legal rights to land or assets, but have a claim to land or assets that is recognised or recognisable under national law; • have no recognisable legal right or claim to the land or assets they occupy or use.
Cut-off date	No specific provision.	The cut-off date is the date of completion of the census and assets inventory of persons affected by the Project. Persons occupying the Project area after the cut-off date are not eligible for compensation and/or resettlement assistance. Similarly, fixed assets (such as built structures, crops, fruit trees, and woodlots) established after the date of completion of the assets inventory, or an alternative mutually agreed on date, will not be compensated.
Cash and in-kind compensation	No specific guide. The law says fair and adequate compensation must be paid.	Strongly favours in-kind compensation, including provision of replacement housing and replacement land with security of tenure.
Calculation of compensation	No specific guide. The law says fair and adequate compensation must be paid.	Compensation is to be provided at 'replacement cost' and is inclusive of the cost to replace assets, plus necessary transaction costs associated with asset replacement. Where functioning markets exist, replacement cost is the market value, plus transaction costs. Where functioning markets do not exist, replacement cost may be determined through alternative means.
Natural resources	No specific provision.	Persons or communities that either temporarily or permanently lose access to natural resources on which their livelihoods are dependent are entitled to assistance. The borrower is required to assesses means to provide, or facilitate access to, similar resources elsewhere, taking into account the impacts at the alternative location, providing cash compensation only when it can be demonstrated that no feasible alternative measures are available.
Consultation with PAPs and	The need for public consultation / participation is identified in both the Land Law (Law No. 9/04, of 9 November) and the	WB ESS5 stipulates the need for affected parties to be meaningfully consulted and that all resettlement activities are planned and

Category	Angolan legislation	WB ESS 5
host communities	Law on Territorial and Urban Planning (Law No. 3/04, of 25 June).	implemented with appropriate disclosure of information.
Resettlement assistance	The need for 'fair compensation' is identified in both the Land Law (Law No. 9/04, of 9 November) and the Law on Territorial and Urban Planning (Law No. 3/04, of 25 June).	Allowance is made for resettlement assistance to affected parties, this is inclusive of 'transitional support'.
Affected populace as project beneficiaries	No specific provision.	Opportunities for community benefaction including improved resource management practices, provision of community infrastructure (schools, access to water, etc.) is desirable.
Owners of "non-permanent" buildings	Paying fair and adequate compensation.	Entitled to in-kind compensation or cash compensation at full replacement cost including transactional expenses, prior to displacement.
Owners of "permanent" buildings	Paying fair and adequate compensation.	Entitled to in-kind compensation or cash compensation at full replacement cost including transactional expenses, prior to displacement.
Perennial crops	No specific provision.	Entitled to compensation for lost assets other than land, which is inclusive of crops, etc..

8.3 Potential Displacement Impacts

A detailed socio-economic baseline is presented in **Section 5.3** and potential resettlement impacts are described and discussed in Table 8-2. Importantly, the impacts discussed here have been identified through a desktop assessment of the area. These impacts will be revised during the compilation of the RAP. Furthermore, the impacts identified relate only to resettlement. Other potential socio-economic risks and impacts are detailed in **Section 7**.

Table 8-2: Potential Displacement Impacts

Impact	Description
Loss of access to agricultural land	During construction, it is likely that access to portions of land currently used for subsistence and commercial agricultural purposes may be lost, either temporarily (laydown areas, construction exclusion zones, etc.) or permanently (tower footprints, sub-station footprint, access road, etc.). As detailed in Section 5.3 , agriculture plays an important role in the livelihoods of communities within the area and any loss of agricultural land has the potential to negatively impact livelihoods. Measures will be taken to provide alternative agricultural land of a similar standard (where possible) to affected parties prior to any losses being incurred and in readiness for the next planting season. In the event of alternative land not being available alternative livelihood restoration measures will be identified in the RAP.
Loss of natural resources	During construction, it is possible that there will be restricted access to certain areas, that may result in some households losing access to natural resources. This will need to be confirmed during the compilation of the RAP, along with the availability of alternative sources for the collection of natural resources. Should the loss of natural resources be identified as having the potential to negatively impact livelihood strategies, restoration measures will be included in the RAP.
Loss of housing and associated infrastructure	Through the review of aerial imagery and a desktop assessment it has been established that there are a number of homesteads within the proposed 2 km corridor. Once the final alignment of the OHTL is confirmed, any homesteads and associated infrastructure within the legally required servitude will need to be relocated. While the resettlement process will ensure that resettled parties are provided with compensation in-kind for lost primary houses of the appropriate standard and size, and will receive compensation (either in kind or cash) for other structures (cattle kraals, toilets, etc.), it is important that the potential subjective socio-economic impacts, such as the emotional stress associated with resettlement, are considered as they can have far reaching impacts that can result in significant opposition to and mobilisation against projects. As such, the RAP compiled for the project as well as the resettlement process will be taking these impacts into consideration.

Impact	Description
Exhumation and reburial of graves	It is possible that some areas with graves and/or cemeteries may fall within the final OHTL servitude or within the footprint of other Project infrastructure. Should any graves be identified within the servitude, during construction some of these may need to be exhumed and reburied to avoid disturbance. Even if a grave will not be directly impacted but is in proximity to project infrastructure, the next-of-kin should be consulted to ensure that there is no unnecessary disturbance and that any traditional ceremonial requirements are undertaken. The presence of any graves will be determined during the RAP compilation.

8.4 Scope of Land Acquisition and Resettlement

This Section provides an overview of the findings from a desktop assessment of the preferred corridors. For the purposes of this section the corridor has been described in two sections, namely:

- i. Cahama to Xangongo; and
- ii. Xangongo to Ondjiva.

8.4.1 Physical Displacement Requirements

Settlement between Chama and Xangongo is concentrated adjacent to the existing road (EN 105) between the two centres but is relatively evenly distributed throughout the length of the corridor.

Settlement between Xangongo and Ondjiva is relatively evenly distributed throughout the length of the corridor. The exception to this is the southernmost portion of the corridor, in close proximity to Ondjiva where settlement within the corridor is notably denser.

Using GIS settlement data (GRID3 AGO Settlements Extents) a total of 1 053 areas where settlement is evident were identified within the preferred corridor between Cahama to Xangongo and 823 areas between Xangongo to Ondjiva.

However, it should be noted that the final OHTL servitude will be significantly smaller than the 2 km corridor, anticipated to be a maximum of 60 m (30 m each side of the centre line). Considering this, and that an approach of avoidance will be followed as far as is practically possible, it is anticipated that while physical resettlement will be required, it will be possible to minimise the number of affected settlements. While the type of structures will be confirmed during a site visit, it is assumed that it will include formal housing, ancillary infrastructure such as storerooms, fences, cattle kraals, etc. as well as possibly shops and other commercial building, especially in close proximity to the road.

Figure 8-1 illustrates the settlement within the preferred OHTL corridor between Cahama and Xangongo and Figure 8-2 illustrates the settlement within the preferred OHTL corridor between Xangongo and Ondjiva.

8.4.2 Economic Displacement Requirements

As is the case with the presence of settlement between Chama and Xangongo, croplands are generally concentrated around the existing road (EN 105) between the two centres and relatively evenly distributed throughout the length of the corridor and croplands relatively evenly distributed throughout the length of the corridor between Xangongo and Ondjiva.

Using GIS settlement data (ESA WorldCover 2021) a total of 1 898 areas where cropland is evident were identified, accounting for 8.45% of the preferred corridor between Cahama and Xangongo and a total of 1 517 areas of cropland were identified, accounting for 7.72% of the preferred corridor between Xangongo and Ondjiva.

However, it should be noted that the final OHTL servitude will be significantly smaller than the 2 km corridor, anticipated to be a maximum of 60 m (30 m each side of the centre line). Considering this, and that an approach of avoidance will be followed as far as is practically possible, it is anticipated that while economic resettlement will be required, it will be possible to minimise the number of affected croplands. Furthermore, with the exception of agricultural areas affected by the access road and tower footprints, most losses will be temporary in nature with affected households being able to continue with the cultivation of crops following the completion of construction. While the type of crops being cultivated, agricultural practices and the size of the plots will be confirmed during the Scoping site visit, it is assumed based on desktop research that the majority of agricultural activities taking place are for subsistence purposes.

Figure 8-3 illustrates area of cropland within the preferred OHTL corridor between Chama and Xangongo and Figure 8-4 below illustrates area of cropland within the preferred OHTL corridor between Chama and Xangongo.

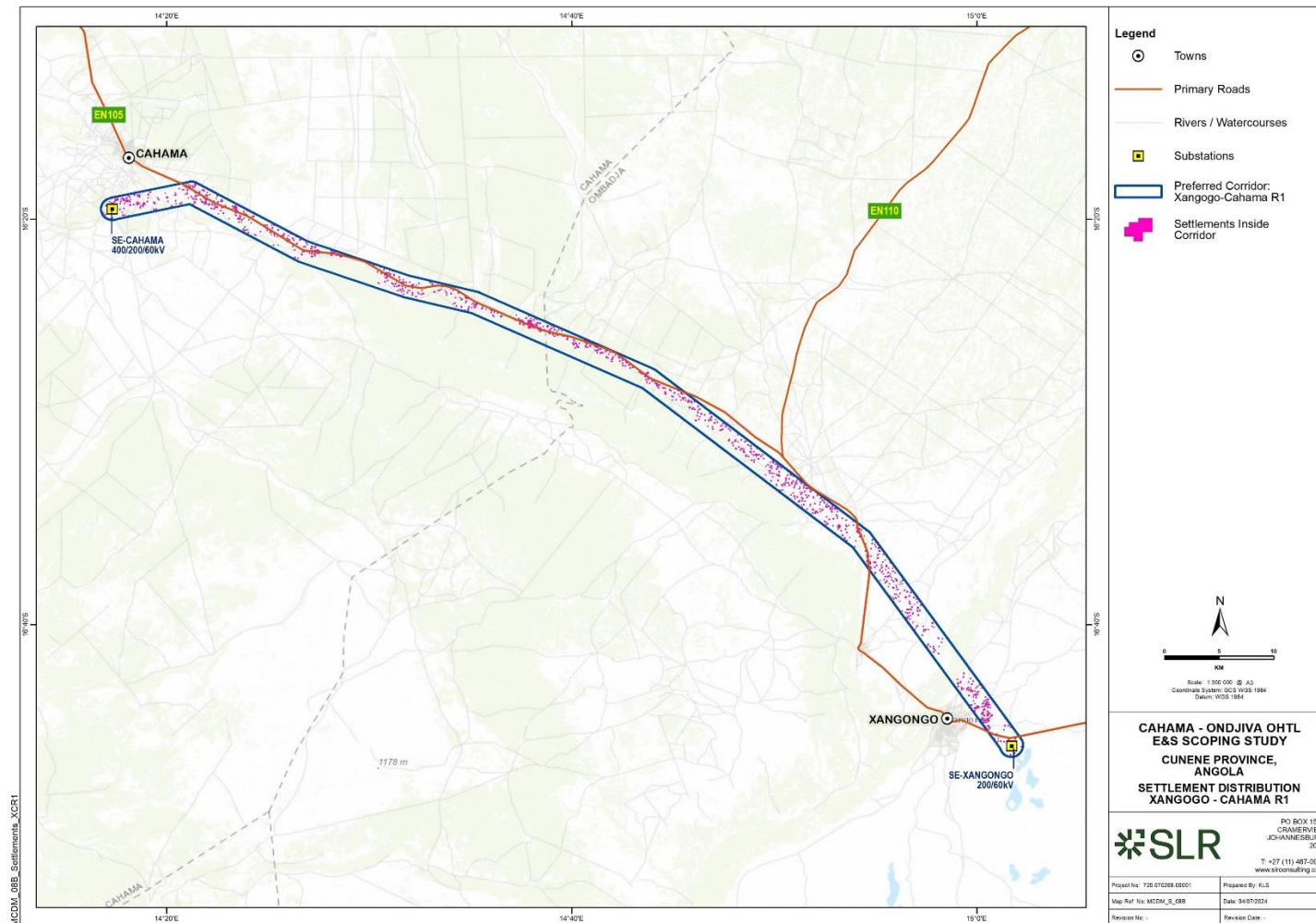


Figure 8-1: Areas of Settlement within the Preferred Corridor between Cahama and Xangongo

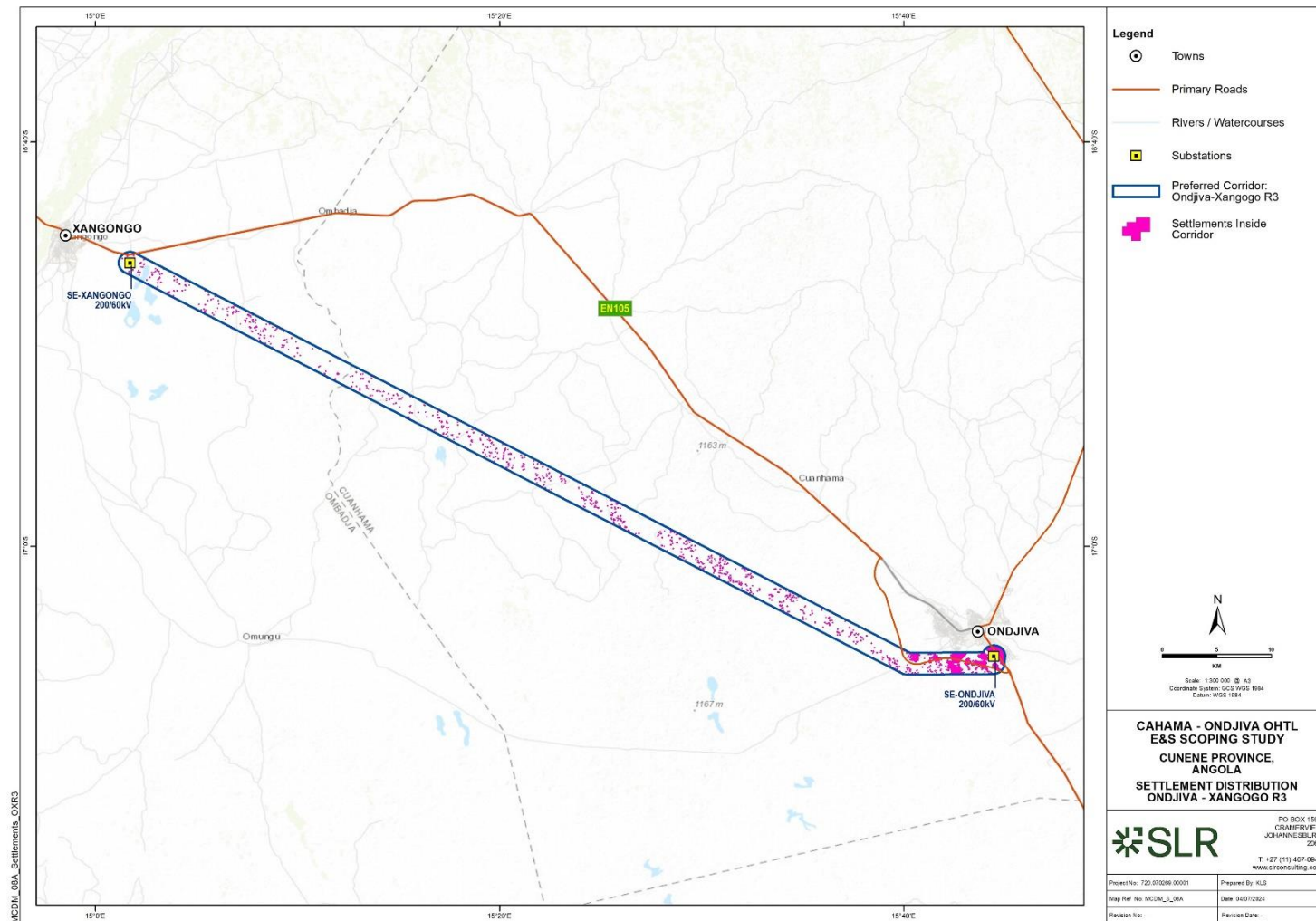


Figure 8-2: Areas of Settlement within the Preferred Corridor between Xangongo and Ondjiva

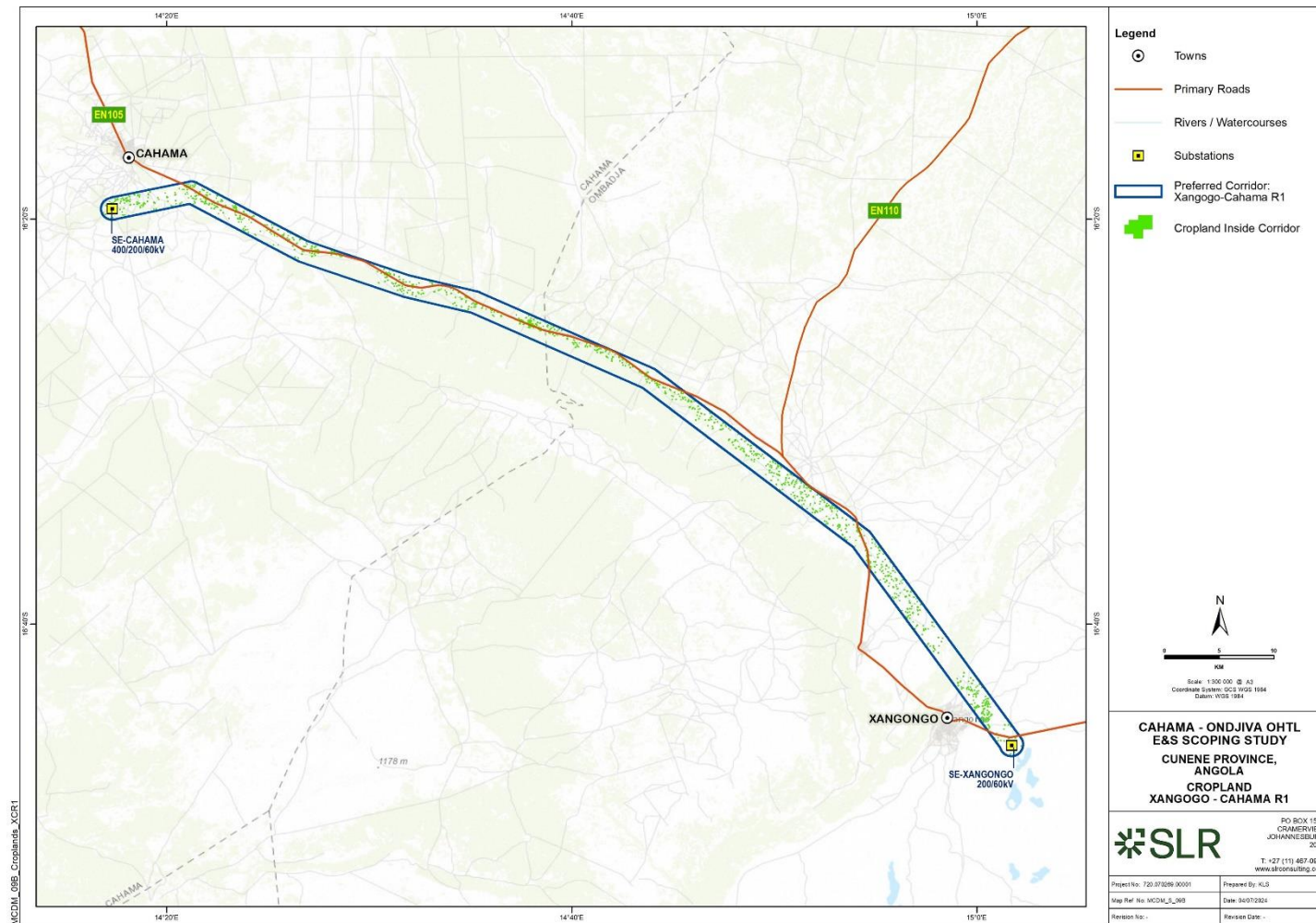


Figure 8-3: Areas of Cropland within the Preferred Corridor between Cahama and Xangongo

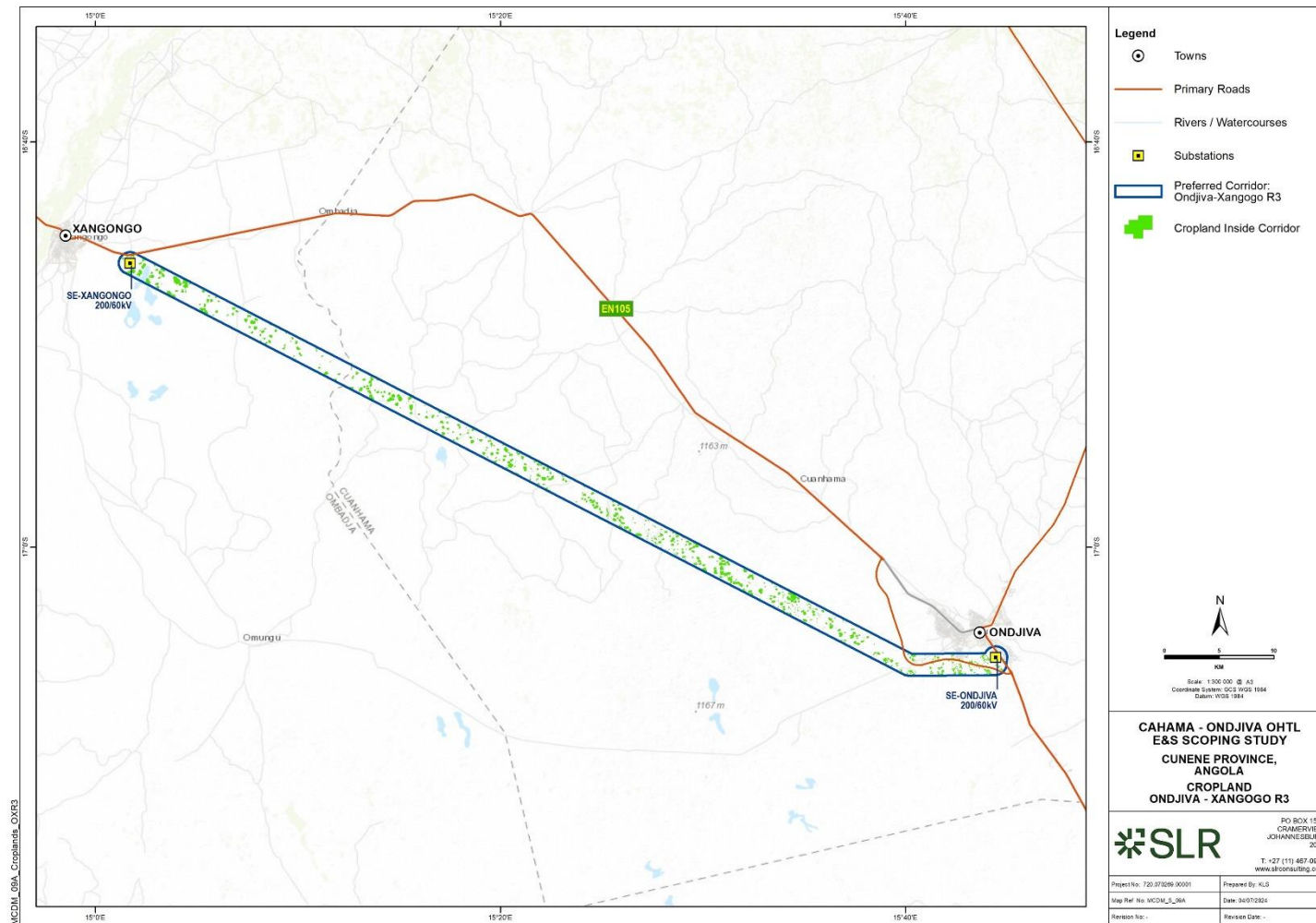


Figure 8-4: Areas of Cropland within the Preferred Corridor between Xangongo and Ondjiva

8.5 Compensation Framework and Entitlement Matrix

8.5.1 Resettlement Principles

Consistent with the WB ESS5 as well as relevant Angolan legislation that makes reference to the need to 'fair compensation' for lost land, the RAP for the Project will be prepared within the framework of the following principles / paradigms:

- Both physical and economic displacement, inclusive of all affected persons, will be undertaken in such a manner that, as a minimum, no one is worse off than prior to resettlement and preferably is 'better off' than prior to resettlement. This will involve restoring and, over time, improving incomes and living standards of affected households and persons, while enabling them to maintain their cultural identities.
- Resettlement will be undertaken within a development paradigm that addresses the socio-economic development needs of resettled households, host communities and the wider region within which the proposed project is being undertaken.

8.5.2 Eligibility and Entitlement Framework

While the different final eligibility criteria will be determined during the compilation of the RAP, in line with the WB ESS5 principles, all households, persons and/or companies requiring physical and/or economic resettlement / displacement or shown to have experienced a loss of revenue as a direct result of the proposed project will be eligible for resettlement and/or compensation including livelihood restoration. This will include:

- Persons with formal legal rights to land or assets;
- Persons who do not have formal legal rights to land or assets, but have a claim to land or assets that is recognised or recognisable under national law⁷⁶;
- Persons who have no recognisable legal right or claim to the land or assets they occupy or use.

Particular attention will be paid to the needs of vulnerable groups among those displaced; especially those below the poverty line; the landless, the elderly, women and children, indigenous groups and ethnic minorities, orphans, or other affected persons who may not be protected through national land compensation legislation.

8.5.2.1 Physical Resettlement / Displacement

All homesteads within the final servitude alignment or footprint of other project infrastructure (substation site, access road, etc.) and, thus, directly affected by the Project will be eligible for resettlement. While the entitlement framework will be compiled during the RAP, based on international best practice, it is assumed that all resettled parties will be entitled to structures of, as a minimum the same standard, but ideally better, to those that were lost as well as assistance in the transition process. Furthermore, any ancillary infrastructure will also be compensated in kind or in cash, based on the preferences of the affected parties. Affected parties should be offered the opportunity to dismantle and salvage any material at their homesteads prior to demolition. The demolition of homesteads will take place only once the construction of the new homesteads is complete, and the affected parties have been

⁷⁶ This includes persons who have obtained land through informal land markets, which are common in Angola, but do not have formal title deeds to the land.

successfully resettled and provided with any other compensation and/or assistance due to them.

8.5.2.2 Economic Resettlement / Displacement

All parties found to have lost access to agricultural land on a permanent basis will be entitled to land of similar quality and size (if available within a reasonable distance from their homestead) with security of tenure on the new land if there is a land-for-land option. Temporarily and/or permanent partial affectations will be assessed and addressed by the Resettlement Action Plan (RAP). Alternative land, if provided, will be demined and prepared for agriculture, and located within a reasonable distance from the homestead. In the event of alternative land not being available, other livelihood restoration measures will be implemented. Damages to crops (including tree crops and wild fruit trees or trees with commercial value, if applicable), will be provided in cash and at replacement cost as per the WB ESS5 and transitional relocation assistance needed will be also included by the RAP. Compensation rates for all lost assets will be confirmed during the compilation of the RAP. Restrictions on land use can be applied if the permanence of agricultural and livestock practices under the corridors of easement or servitude will be recommended by the RAP in line with the conditions entailed by the national regulations of the Energy Sector.

8.5.2.3 Other Impacts

Other potential impacts requiring compensation, including but not limited to the exhumation and reburial of graves, loss of access to natural resources, loss of access to grazing areas, trees and areas with cultural value that occur as a result of the project will be compensated for in accordance with the principles described in WB ESS5.

8.5.2.4 Vulnerable Groups

During the compilation of the RAP, it is necessary to identify vulnerable groups and to assess their needs related to resettlement and relocation assistance. Vulnerable groups, as for all other affected people, must be engaged in meaningful consultations regarding resettlement options and assistance. A particular attention will be secured on the assessment of potential impacts related to physical, economic and/or deprivation of the access to natural resources that may affect Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities (IP/SSAHUTLC), and meaningful consultations will be held following the specific requirements entailed in the WB ESS7. However, consultation with vulnerable groups may require a special approach that will enable them to participate equally in the process (i.e. involvement of social workers, use of a different language, or carrying out the consultations in an accessible venue, including for people with disabilities, at a particular time of day when, for example, affected single parents are available, etc.). Once vulnerable groups are identified, a needs assessment will be performed to define the most appropriate measures for providing resettlement assistance.

8.6 Process for Preparing a Resettlement Action Plan

The resettlement action planning process can take between six and 18 months, depending on the number of affected parties, the complexity of the project and the complexity of the resettlement and livelihood restoration process. Once the final OHTL alignment has been approved a RAP will be compiled.

Figure 8-5 provides an overview of the process involved in the preparation of a RAP. While the diagram is presented as a linear process, the development of a RAP is seldom undertaken in a linear manner with aspects requiring reassessment and adjustments as PAPs are engaged with and eligibility and entitlement are agreed to.

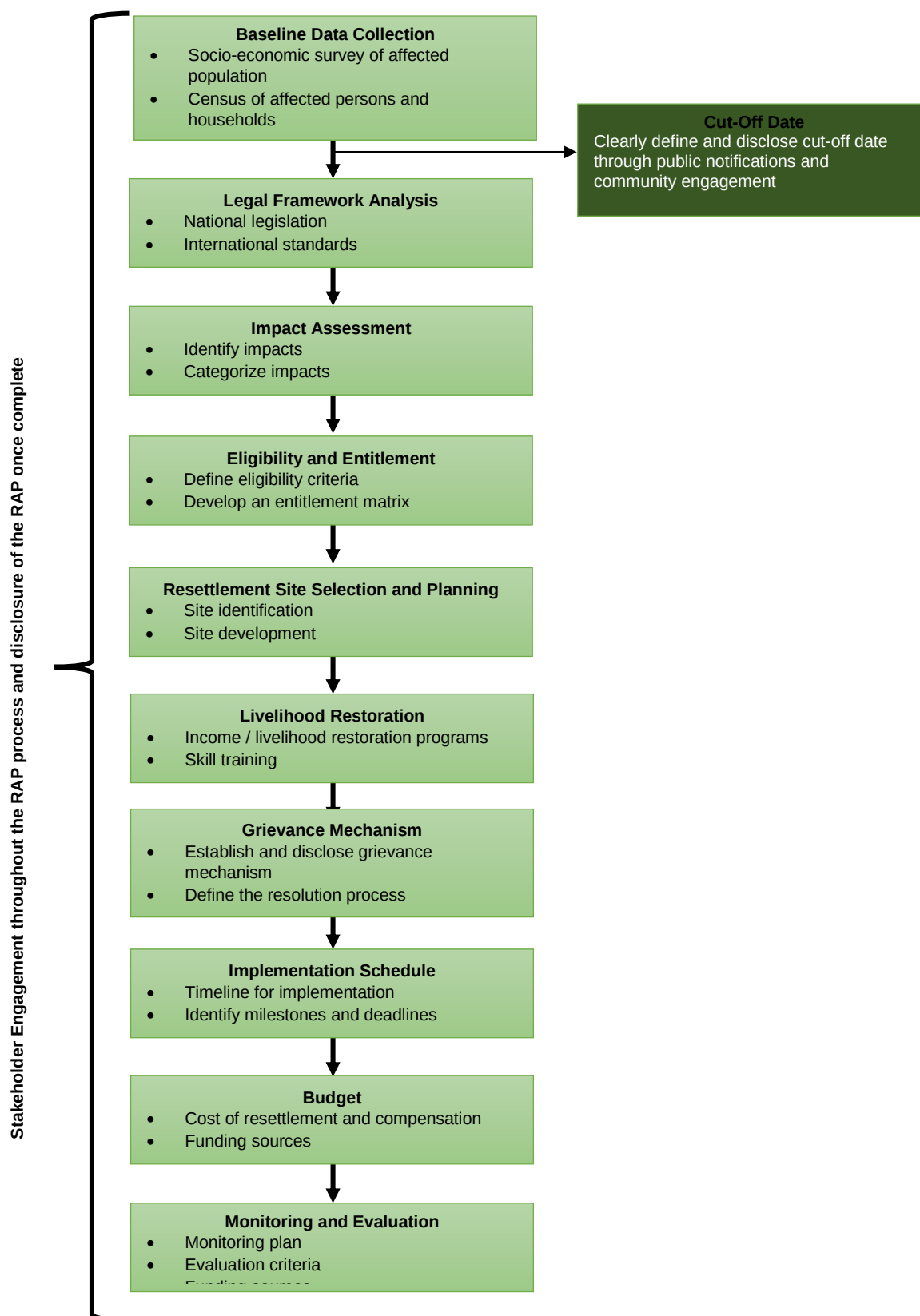


Figure 8-5: Process for the Preparation of a RAP

9.0 Terms of Reference for the ESIA

9.1 Overview

Potential E&S risks and impacts associated with the Project have been identified in the E&S Scoping Report.

The ESIA study will aim to identify further potential impacts caused by the Project on the physical, biological, cultural and social environments. The ESIA will focus on whether the potential adverse impacts of the Project are significant and further identify mitigation measures that will allow the Project to avoid, minimise / reduce and compensate these impacts and enhance potential positive impacts where practicable. The ESIA study will provide the relevant authorities with sufficient information to make an informed decision regarding the Project.

It is noted that whilst the ESIA Report will need to comply with Angolan legislation to meet local regulatory requirements, it will further comply with the applicable WBG SSs and other international Lender standards including GIIP.

9.2 ESIA Objectives

The ESIA study will aim to achieve the following:

- Develop an understanding of the environment likely to be affected by the Project;
- Document options for the location of Project infrastructure;
- Identify the potential E&S impacts of the Project;
- An assessment of the extent, duration, intensity, probability and significance of the identified potential environmental, social and cultural impacts of the Project, including cumulative impacts;
- A comparative assessment of the identified alternatives and their potential environmental, social and cultural impacts;
- Provide appropriate mitigation measures for each significant impact of the Project;
- Document of the stakeholder engagement process followed during the course of the assessment and an indication of how the issues raised have been addressed;
- Identify knowledge gaps and report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information; and
- Develop an ESMP.

9.3 Approach to Undertaking the ESIA Study

9.1.1 Authority Consultation

On-going consultation with the MINAMB and other regulatory authorities at national and provincial level will be undertaken throughout the ESIA duration. Authority consultation is, therefore, seen as a continuous process that takes place until completion of the environmental and social investigations.

9.1.2 Project Area of Influence

At this stage, the development footprint includes, the OHTL corridor and substations.

According to IFC's PS 1, the Project Area of Influence (AoI) encompasses:

- The area likely to be affected by (i) the Project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the Project; (ii) impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which affected communities' livelihoods are dependent;
- Associated facilities, which are facilities that are not funded as part of the Project, and that would not have been constructed or expanded if the project did not exist and without which the Project would not be viable; and
- Cumulative impacts that result from the incremental impact on areas or resources used or directly impacted by the project from which other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Project Aol will need to be defined at the commencement of the ESIA study, once detailed design is available, and in line with the WBG ESS 1 criteria. The focus areas for the specialist scopes will be aligned with the relevant Aol.

9.1.3 ESIA Process and Tasks

The ESIA process and corresponding activities are outlined in Table 9-1.

Table 9-1: ESIA Process and Tasks

Objectives	Corresponding Activities
Specialist Investigations	
• Provide a detailed description of the potentially affected environment. • Specialist assessment of identified potential environmental and social impacts.	• Commencement of specialist baseline fieldwork and impact assessments. • Compilation of specialist reports. • Introductory Stakeholder Engagement.
ESIA Reporting	
• Assessment of potential environmental and social impacts. • Design requirements and management and mitigation measures. • Disclosure of detailed ESIA Report including the ESMP.	• Compilation of draft ESIA report including an ESMP. • Public feedback meetings with stakeholders (pre-ESIA submission). • Update the ESIA report with comments and concerns raised at the feedback meetings. • Submit finalised ESIA and ESMP reports to MINAMB for review and public consultation. • Disclosure of MINAMB decision to all registered stakeholders.

9.1.4 Specialist Studies

Based on the findings of the E&S Scoping Report, the following baseline specialist studies will need to be commissioned and will play a crucial role in the ESIA study (Table 9-2).

Table 9-2: ToR for Baseline Specialist Studies in the ESIA Phase

Specialist Study	Approach
Climate Change Risk Assessment &	A Climate Change Risk Assessment and GHG Emissions Inventory is required in line with the second <i>Nationally Determined Contribution (NDC)</i> , 2050 <i>National Climate Change</i>

Specialist Study	Approach
GHG Emissions Inventory	<i>Strategy</i>, and <i>Vision 2030</i>, to understand the country's current and future contributions to the build-up of GHGs. The assessment will include: - Quantification the Project's annual GHG emissions; - Qualitative assessment of the physical (i.e., related to physical impacts of climate change) and transitional risks (i.e., impacts related to the transition to a lower-carbon economy) to the Project. This assessment will also consider impacts on biodiversity conservation and provision of ecosystem services that may be exacerbated by climate change; - Preparation of a report inclusive of an impact assessment; and - Identification of high-level measures to reduce the Project's GHG emissions.
Biodiversity Assessment (Terrestrial and Aquatic Ecology)	A Biodiversity Assessment is required to build on the baseline presented in the E&S Scoping Report. The assessment will include: - Site visit and infield verification. - A description of the habitat and biodiversity characterisation; natural, modified and critical habitats, protected and sensitive areas including KBAs, IBAs, etc.; and ecosystem services in the Aol; - Undertake sensitivity mapping highlighting habitats of concern, biodiversity hot spots, protected and sensitive areas, critical habitats, and other important locations, such as locations expected to provide ecosystem services; - Describe and assessment impacts; and - Preparation of a high-level Biodiversity Management Plan (BMP) for inclusion in the ESMP.
Geology and Topography	Detailed site survey of the Project site to identify and map geological and geotechnical/hydrogeological features along with their relevance to the project. Geo-hazards and any negative impacts should be identify and assessed. Description and analysis of land cover, soil types, quality, and distribution over the interested area
Surface Hydrology and Ground Water (including water quality)	Assess the water sourcing & permitting requirements as well as potential impacts on local communities. This should include the assessment of the sustainability of groundwater and/or surface resources, and aspects such as ecological flow requirements in any surface water resources the Project might exploit. If groundwater resources are potentially limited and/or there is an indication of potential impacts on other users to ecological aspects, a groundwater model should be developed. Assess the water sourcing & permitting requirements as well as potential impacts on local communities. This should include the assessment of the sustainability of groundwater and/or surface resources, and aspects such as ecological flow requirements in any surface water resources the Project might exploit. If groundwater resources are potentially limited and/or there is an indication of potential impacts on other users to ecological aspects, a groundwater model should be developed.
Air Quality	Air quality monitoring baseline should be undertaken at the Project site, and any sensitive off-site locations which may be impacted by the Project. The minimum suite of air quality parameters that will be monitored are those that are expected to be affected by the Project's development. The Consultant is expected to provide a classification of site environment, establish present background air pollutants, applicable ambient air quality limits for the area, local dimensioning practice, and assessment of future expected air quality
Environmental Noise & Vibration	Noise, and if applicable vibration, monitoring baseline should be undertaken at the Project site, and any sensitive off-site locations which may be impacted by the Project. The Consultant is expected to provide a classification of the site environment, establish present background noise level, identify applicable noise limits and location of boundary, describe mitigation measures envisaged and assess the future expected noise, and if applicable vibration, levels during operations.
Wastewater & Solid Waste	List expected types of waste and treatment envisaged/recommended, demonstrating that the Project is enforcing the mitigation hierarchy (avoid, minimize, reuse, recycle, dispose). Map local disposal options and associated quality requirements, including the permitting status of local landfills and their compliance with international standards and guidelines. Assess local recycling capacity for wastes generated by the Project (including the potential for waste to energy), and any needs, longer term, for building local capacity.
Ornithological Survey	Undertake an ornithological survey in line with relevant standards which entails: - Monitoring of migration pattern at selected localities representative of the OHTL corridor; and - Carcass surveys of existing powerlines in the vicinity of the OHTL corridor. The results of the Ornithological Surveys will be presented in a report with an impact assessment and associated mitigations.

Specialist Study	Approach
Critical Habitat Assessment	The Critical Habitat Assessment (CHA) will identify where Critical Habitat present in the Project area and present this spatially so that a project infrastructure overlay can be used to determine whether the Project will have any impact on Critical Habitat or not. A CHA report will be produced, including conclusions and recommendations.
Social Impact Assessment including Community Health and Safety	The social, community health and safety impact assessment will include: • A description of the socio-economic baseline (desktop supplemented by fieldwork); • Preparation of a report inclusive of an impact assessment; and • Preparation of a social management plan summarising the social risks and the measures necessary to manage them.
Heritage Assessment	The specific scope of work will entail the following: • Review all relevant literature (including previous reports) and existing project information to develop an inventory of known cultural heritage resources and where possible, verification of these sites and classification / mapping according to Angolan legal requirements and GIIP; • Conduct a field survey of the site and the surrounding environment (including any supporting infrastructure such as access roads, etc.); • Interact with stakeholder engagement lead to ensure identification of intangible cultural heritage; • Compile a baseline description of heritage resources according to local Angolan legislation as well as international best practice and guidelines such as the UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage. The Heritage Impact Assessment is not limited to archaeological artefacts, historical buildings, and graves. It will also include intangible and invisible resources such as places, oral traditions, and rituals. A heritage resource is defined any place or object of cultural significance i.e., of aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance; • Assess the significance of all potential project-related impacts (direct, indirect, and cumulative); • Recommend measures to mitigate any negative project-related impacts, which will entail application of the Mitigation Hierarchy for each impact; and • The Heritage Impact Assessment will advise on the need for any heritage permits which may be required.
Visual Assessment	The specific scope of work will entail the following: • Review all relevant literature (including previous reports) and existing project information; • Conduct a field survey of the site and the surrounding environment (including any supporting infrastructure such as access roads, construction camps, etc.) – if required; • Compile a baseline description inclusive of maps; and • Recommend measures to mitigate or/and compensate any negative project-related impacts, which will entail application of the Mitigation Hierarchy for each impact and enhance positive impacts.
Resettlement Action Plan (RAP)	Compile a RAP that complies with the requirements of the relevant World Bank ESS standards, in particular ESS5 as well as relevant Angolan legislation. The RAP should as a minimum include: • Identification of potential impacts – identify project components or activities that give rise to displacement, the scope of land acquisition, measures taken to minimise displacement, etc. • Objectives – detail the main objectives of the resettlement program. • Census survey and baseline socioeconomic studies – undertake and detail the findings of a household-level census identifying and enumerating all affected households and assets. • Legal framework – review and detail relevant legislation and policy documents and undertake a gap analysis between Angolan laws and WB ESS5 or other applicable standards. • Institutional framework – identify agencies responsible for resettlement activities • Eligibility – define the displaced persons/households and identify criteria for determining their eligibility for compensation and other resettlement assistance. • Valuation of and compensation for losses – develop a methodology to be used in valuing losses to determine their replacement cost; and a description of the proposed types and levels of compensation for land, natural resources, and other assets

Specialist Study	Approach
	- Community participation – detail the strategy for consultation with, and participation of, displaced persons in the design and implementation of the resettlement activities and a summary of the views expressed and how these views were taken into account in preparing the resettlement plan. - Implementation schedule – compile an implementation schedule providing anticipated dates for displacement and estimated initiation and completion dates for all resettlement plan activities. - Costs and budget – provide a budget with categorized cost estimates for all resettlement activities - Grievance redress mechanism – develop a grievance mechanism describing the procedures for third party settlement of disputes arising from displacement or resettlement - Monitoring and evaluation – detail measures for monitoring of displacement and resettlement activities by the implementing agency, supplemented by third-party monitors.
Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities Plan (IP / SSAHUTLC)	Develop an Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities Plan (IP/SSAHUTLC) that aligns with the IFC PS 7 and WB ESS 7 and as a minimum includes: - Baseline data collection and analysis – identify IP / SSAHUTLC within the Project area, conduct baseline studies to understand socio-economic conditions, cultural heritage and traditional livelihood systems. - Stakeholder engagement – undertake stakeholder engagement with IP / SSAHUTLC communities. - Impact assessment – identify potential project related socio-economic and environmental impact on IP / SSAHUTLC including potential restriction to land, resources or area of cultural significance. - Mitigation and management measures – develop culturally appropriate measures / strategies for mitigating negative impacts and enhancing positive impacts.

9.1.5 Impact Assessment and Mitigations

9.1.5.1 Impact Assessment Methodology

The method to be used for the assessment of impacts is set out hereunder. This assessment methodology enables the assessment of E&S impacts including: cumulative impacts, the intensity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

Part A provides the definition for determining impact consequence (combining intensity, extent, and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Parts B and C. The impact significance is interpreted in Part D. This methodology is utilised to assess both the incremental and cumulative project related impacts.

Table 9-3: Impact Significance Determination

PART A: DEFINITIONS AND CRITERIA		
Definition of SIGNIFICANCE		Significance = consequence x probability
Definition of CONSEQUENCE		Consequence is a function of intensity, extent, and duration
Criteria for ranking of the INTENSITY of environmental impacts	Very Low	- Negligible change, disturbance, or nuisance with very minor consequences or deterioration. - Targets, limits, and thresholds of concern never exceeded. - Species or habitats with negligible importance.
	Low	Minor (Slight) change, disturbance, or nuisance with minor consequences or deterioration.

PART A: DEFINITIONS AND CRITERIA		
		- Targets, limits, and thresholds of concern rarely exceeded. - Habitats and ecosystems which are degraded and modified.
	Medium	- Moderate change, disturbance, or discomfort with real but not substantial consequences. - Targets, limits, and thresholds of concern may occasionally be exceeded. - Habitats or ecosystems with important functional value in maintaining biotic integrity.
	High	- Prominent change, disturbance, or degradation with real and substantial consequences. - May result in illness or injury. - Targets, limits, and thresholds of concern regularly exceeded. - Habitats or ecosystems which are important for meeting national/provincial conservation targets.
	Very High	- Severe change, disturbance, or degradation with severe consequences. - May result in severe illness, injury, or death. - Targets, limits, and thresholds of concern are continually exceeded. - Habitats or ecosystems of high importance for maintaining the persistence of species or habitats that meet critical habitat thresholds.
	Very Low+	- Negligible change or improvement. - Almost no benefits. - Change not measurable/will remain in the current range.
	Low+	- Minor change or improvement. - Minor benefits. - Change not measurable/will remain in the current range.
	Medium+	- Moderate change or improvement. - Real but not substantial benefits. - Will be within or marginally better than the current conditions.
	High+	- Prominent change or improvement. - Real and substantial benefits. - Will be better than current conditions.
	Very High+	- Substantial, large-scale change or improvement. - Considerable and widespread benefit. - Will be much better than the current conditions.
Criteria ranking for the DURATION of impacts	Very Short term	Very short, always less than a year or may be intermittent (less than 1 year). Quickly reversible.
	Short term	Short term occurs for more than 1 but less than 5 years. Reversible over time.
	Medium term	Medium-term, 5 to 10 years.
	Long term	Long term, between 10 and 20 years. Likely to cease at the end of the operational life of the activity or because of natural processes or by human intervention.
	Permanent	Very long, permanent, +20 years. Irreversible. Beyond closure or where recovery is not possible either by natural processes or by human intervention.
Criteria ranking for the EXTENT of impacts	Portion of site	The impact is limited to the immediate footprint of the activity and within a confined area.
	Whole site	The impact is confined to within the project area and its nearby surroundings.

PART A: DEFINITIONS AND CRITERIA

	Beyond site	The impact goes beyond the site boundary, affecting immediate neighbours.
	Local	The impact extends far beyond the site boundary.
	Regional/ National	The impact extends beyond district or regional boundaries, with national implications.

PART B: DETERMINING CONSEQUENCE – APPLIES TO POTENTIAL POSITIVE OR ADVERSE IMPACTS

		EXTENT				
		Portion of site	Whole site	Beyond the site, affecting neighbours	Local area extending far beyond site	Regional/ National
INTENSITY = VL						
DURATION	Very short term	Very Low	Very Low	Very Low	Low	Low
	Short term	Very Low	Very Low	Low	Low	Medium
	Medium term	Very Low	Low	Low	Medium	Medium
	Long term	Low	Low	Medium	Medium	Medium
	Very long term/permanent	Low	Medium	Medium	Medium	High
INTENSITY = L						
DURATION	Very short term	Very Low	Very Low	Low	Low	Medium
	Short term	Very Low	Low	Low	Medium	Medium
	Medium term	Low	Low	Medium	Medium	Medium
	Long term	Low	Medium	Medium	Medium	High
	Very long term/permanent	Medium	Medium	Medium	High	High
INTENSITY = M						
DURATION	Very short term	Very Low	Low	Low	Medium	Medium
	Short term	Low	Low	Medium	Medium	Medium
	Medium term	Low	Medium	Medium	Medium	High
	Long term	Medium	Medium	Medium	High	High
	Very long term/permanent	Medium	Medium	High	High	High
INTENSITY = H						
DURATION	Very short term	Low	Low	Medium	Medium	Medium
	Short term	Low	Medium	Medium	Medium	High
	Medium term	Medium	Medium	Medium	High	High
	Long term	Medium	Medium	High	High	High
	Very long term/permanent	Medium	High	High	High	Very High
INTENSITY = VH						
DURATION	Very short term	Low	Medium	Medium	Medium	High
	Short term	Medium	Medium	Medium	High	High
	Medium term	Medium	Medium	High	High	High
	Long term	Medium	High	High	High	Very High
	Very long term/permanent	High	High	High	Very High	Very High

PART C: DETERMINING SIGNIFICANCE - APPLIES TO POSITIVE OR ADVERSE IMPACTS						
		CONSEQUENCE				
		Very Low	Low	Medium	High	Very High
PROBABILITY (of exposure to impacts)	Unlikely	Insignificant	Insignificant	Very Low	Low	Medium
	Conceivable	Insignificant	Very Low	Low	Medium	High
	Possible/ frequent	Insignificant	Very Low	Low	Medium	High
	Probable/ likely	Very Low	Low	Medium	High	Very High
	Highly likely/ definite/ continuous	Very Low	Low	Medium	High	Very High

PART D: INTERPRETATION OF SIGNIFICANCE		
Significance		Decision guideline
Insignificant		Inconsequential, not requiring any consideration.
Very Low	Very Low +	These beneficial or adverse impacts will not influence the decision. In the case of adverse impacts, mitigation is not required.
Low	Low +	These beneficial or adverse impacts are unlikely to influence the decision. In the case of adverse impacts, limited mitigation is likely to be required.
Medium	Medium +	These beneficial or adverse impacts may be important but are not likely to be key decision-making factors. In the case of adverse impacts, mitigation will be required.
High	High +	These beneficial or adverse impacts are considered to be very important considerations and must influence the decision. In the case of adverse impacts, substantial mitigation will be required.
Very High	Very High +	Represents a key factor in decision-making. Adverse impact would be considered a potential fatal flaw unless mitigated to lower significance.

Additional criteria that are taken into consideration in the impact assessment process to describe the impact further and support the interpretation of significance in the impact assessment process include:

- the degree to which impacts may cause irreplaceable loss of resources;
- the degree to which impacts can be avoided;
- the degree to which impacts can be reversed;
- the degree to which the impacts can be mitigated; and
- the extent to which cumulative impacts may arise from interaction or combination of other planned activities or projects.

Definitions for these supporting criteria are indicated in Table 9-4.

Table 9-4: Categorisation and Description of Additional Assessment Criteria

Criteria	Rating	Description
Criteria for DEGREE TO WHICH AN IMPACT CAN BE REVERSED	FULLY REVERSIBLE	Where the impact can be completely reversed.
	PARTIALLY REVERSIBLE	Where the impact can be partially reversed and is temporary.
	IRREVERSIBLE	Where the impact cannot be reversed and is permanent.
Criteria for DEGREE OF IRREPLACEABLE RESOURCE LOSS	NONE	It will not cause irreplaceable loss.
	LOW	Where the activity results in a marginal effect on an irreplaceable resource.
	MEDIUM	Where an impact results in a moderate loss, fragmentation or damage to an irreplaceable receptor or resource.
	HIGH	Where the activity results in an extensive or high proportion of loss, fragmentation or damage to an irreplaceable receptor or resource.
Criteria for DEGREE TO WHICH IMPACT CAN BE AVOIDED	HIGH	The impact can be avoided through the implementation of preventative mitigation measures.
	MEDIUM	The impact cannot be avoided, but mitigation measures can reduce the significance.
	LOW	The impact cannot be avoided but can be mitigated to acceptable levels through rehabilitation and restoration.
	NONE	The impact cannot be avoided, and consideration should be given to compensation and offsets.
Criteria for the DEGREE TO WHICH IMPACT CAN BE MITIGATED	HIGH	Mitigation can be easily applied or is considered standard operating practice for the activity and will reduce the impact significance rating.
	MEDIUM	Mitigation is feasible and will may reduce the impact significance rating.
	LOW	Some mitigation is possible but will have a marginal effect in reducing the impact significance rating.
	NONE	No mitigation is possible, or mitigation, even if applied, would not change the impact.
Criteria for POTENTIAL FOR CUMULATIVE IMPACTS	UNLIKELY	There is a low likelihood of cumulative impacts arising.
	POSSIBLE	Cumulative impacts with other activities or projects may arise.
	LIKELY	Cumulative impacts with other activities or projects, either through interaction or in combination, can be expected.

9.1.5.2 Development of Mitigation and Enhancement Measures

The mitigation hierarchy (Figure 7-1) is used to avoid or prevent impacts, or where avoidance is not possible, minimise and finally to rehabilitate or offset / compensate impacts to workers, communities, and the environment. For positive impacts enhancement measures will be proposed.

9.4.6 Stakeholder Engagement

Stakeholder engagement aims to give enough accessible information to enable stakeholders to understand the context of the impact assessment reports, and to become informed and educated about the proposed project and its potential impacts.

Stakeholder engagement is a key pillar of any impact assessment process. It is a legal requirement and required in terms of the ESS 10 of the WBG guidance notes. Engagement also helps to identify issues of concern from local stakeholders, or to provide suggestions for enhanced benefits and commenting on alternatives. Overall, it helps to contribute local knowledge and experience, and supports to verify that stakeholder comments, issues of

concern and suggestions have been captured and considered in the process, and to continually engage on issues that may affect stakeholders and project affected people.

The nature and frequency of stakeholder engagement will be proportionate to the nature and scale of the Project and its potential adverse impacts on affected communities, the sensitivity of the environment and the level of public interest.

An SEP must be developed with the updated stakeholder mapping and details on the ESIA phase engagement. The SEP will include a grievance mechanism in compliance with WBG ESS10.

- **Engagement:** Prior to and during the site visit stakeholder engagement is proposed with government stakeholders, the public, major land users and owners and NGOs.
- **Public Disclosure:** An easy-to-understand Non-Technical Summary (NTS) Report will be prepared for use during the stakeholder engagement process where feedback on the outcome of the ESIA will be provided. The NTS will be overarching and serve to inform the general public and other interested parties of project activities. The NTS shall be in the form of a concise, standalone document. An ESIA pack, inclusive of the draft NTS Report, the draft SEP and the draft ESMP, will be translated into Portuguese and made available for public review and comment in English and Portuguese. Following the ESIA disclosure period, disclosure activities as well as feedback received from the public

The Project's consultation and disclosure process will satisfy both the Angolan legislative requirements and the IFC's stakeholder engagement prescriptions, therefore, the following will require implementation as outlined in Table 9-5.

Table 9-5: Stakeholder Engagement Requirements

Aspect	Key Requirements	Tool
Stakeholder analysis and planning	• Identify PAPs, including vulnerable groups⁷⁷ • Preparation of a SEP	• Maintain live Stakeholder Database • Project SEP
Disclosure of information	Provide stakeholders with access to information on: • Purpose, nature and scale of the project • Duration of proposed project activities • Any risks, potential impacts and mitigation measures • Proposed stakeholder engagement process	• Letters to Landowners & Neighbouring Landowners • Background Information Documents (BIDs) • Site Notices • Advertisements • Reports for public disclosure
Consultation	Consultation will be in line with the degree of potential project impacts and will: • Begin early and continue throughout the project lifecycle • Be based on prior disclosure and dissemination of information; • Focus on those directly affected • Be free of outside interference and external manipulation	• Consultation during the ESIA through public Meeting(s) and Focus Group Meeting(s)

⁷⁷ Vulnerable stakeholders are defined as those who may be differently or disproportionately affected by the Project due to pre-existing disadvantaged status, or whose situation may mean that they are hard to reach, and/or require differentiated measures in consultation and disclosure activities to allow their effective participation.

Aspect	Key Requirements	Tool
	• Enable meaningful participation • Be documented	
External communications	Implement and maintain a procedure for external communications that: • Registers communication • Screens and assesses issues raised • Tracks and documents responses	• Project Community Liaison Officer (CLO) activities • Maintain a Comments and Responses Report (CRR)
Complaint Form for Project Affected Communities	• Establish a complaint / comment (grievance) form to receive and facilitate resolution of Affected Communities' concerns and grievances about the Project	Grievance Redress Mechanism
On-going reporting to affected communities	• Report to the community with frequency that is proportionate to the concerns of affected communities but not less than annually	Project CLO activities

9.4.7 Environmental and Social Management Plan

During the compilation of the ESIA, an ESMP will be compiled to provide the outcomes and actions for the management of identified environmental impacts emanating from the Project. The ESMP will include a detailed outline of the implementation programme for the management of negative environmental impacts. The ESMP will further provide strategies to be used to address the roles and responsibilities of environmental management personnel on-site, and a framework for environmental compliance monitoring. Monitoring would be required to identify whether: (a) impacts or their associated Project components remain in conformance with applicable standards; and (b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

Key objectives of the ESMP are as follows:

- To ensure continuing compliance with legal requirements and government policies;
- To provide the initial mechanism for ensuring measures identified in this study to mitigate potentially adverse impacts are implemented;
- To provide a framework for mitigating impacts during project execution;
- To provide assurance to regulators and stakeholders that their requirements with respect to Health, Safety and Environmental performance will be met;
- To undertake monitoring to demonstrate that predictions made within the ESMP are valid; and
- To provide a framework for the compliance with auditing and inspection programs.

The ESMP is an important tool to ensure that the health, safety and security of people and communities within and vicinity of the Project are protected.

The ESMP will be compiled to provide the outcomes and actions to mitigate the identified environmental and social impacts emanating from the Project. The ESMP will include a detailed outline of the implementation programme for the management of negative environmental impacts.

The ESMP will further provide strategies to be used to address the roles and responsibilities of environmental management personnel on-site, and a framework for environmental compliance monitoring.

Monitoring would be required to identify whether: (a) impacts or their associated Project components remain in conformance with applicable standards; and (b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

ESMP shall provide (a) a specific description and technical details of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

To strengthen environmental and social management capability in the agencies responsible for implementation, the ESMP should recommend the establishment or expansion of the parties responsible, the training of staff and any additional measures that may be necessary to support the implementation of mitigation measures and any other recommendations of the environmental and social assessment.

For all three aspects (mitigation, monitoring, and capacity development), the ESMP shall provide (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the ESMP.

10.0 Conclusion

10.1 Key Findings

This E&S Scoping Report has been compiled in compliance with Angolan legislation as well as relevant international Lender standards including the WBG ESSs.

The E&S Scoping Report has identified and provided:

- A description of the proposed activity and alternatives;
- The identification of legislation, policies, standards and guidelines applicable to the development;
- A description of the environment that may be affected by the scope of work and the manner in which the physical, biological, social, and economic aspects of the environment may be affected by the proposed activity;
- An identification of the key E&S impacts and risks, and
- Details of the stakeholder engagement process conducted to date.

Based on the consideration of the Project description and preliminary E&S observations, the Project has the potential to impact both negatively and positively on the environment (biophysical and social).

10.1.1 Biophysical Considerations

The Project's Aol encompasses two terrestrial ecoregions: the Zambezan Baikiaea Woodlands and the Angolan Mopane Woodlands. Within this area, two IBAs - Mupa and Bicular National Parks - have been designated to the north and are also classified as KBAs. These regions exhibit high species richness, particularly of Zambezan biome-restricted species such as the Pale-billed Hornbill, Miombo Tit, Miombo Wren-warbler and White-winged Babbling Starling.

Extensive floodplain wetland and lake habitats in the area support at least 31 species of waterbirds, including the globally threatened Wattled Crane. These habitats may facilitate regular movements of waterbirds between southern Angola and wetlands further south, potentially intersecting the Project area.

Moreover, twenty-six threatened birds, mammals, fish, and plant species have distributions that overlap with the Project area, highlighting the significant biodiversity within the Aol.

10.1.2 Social Considerations

The Project's Aol includes highly populated areas where numerous residents might be affected by the development activities. As such, a thorough Resettlement Action Plan (RAP) and/or a Livelihood Restoration Plan (LRP) is required in the ESIA phase to mitigate any adverse impacts on the local communities.

There are a number of sensitive receptors in close proximity to the Project's Aol. As such, further community health and safety considerations are required in the ESIA.

10.1.3 Project Benefits

The Project is a key component of Angola's broader electrification strategy designed to improve access to cleaner energy sources with lower emissions, reduce transmission costs through increased route options, and minimize the risk of supply interruptions. By bolstering the Country's energy infrastructure, the Project aims to support economic growth, alleviate poverty, and enhance the quality of life for Angolan citizens. Should the status quo persist, GHG emissions will prevail as energy will continue to be sought through non-renewable

sources due to a lack of grid connection infrastructure to evacuate power generated from renewable energy facilities planned for this region of Angola.

Other Project benefits include some, limited employment opportunities during the construction phase.

10.2 Key Recommendations

There are some unavoidable impacts to the receiving environment, as with any development of this nature. The option to proceed with the OHTL outweighs the 'No-Project'. This E&S Scoping Report has presented a ToR for the next phase of assessment, which includes detailed specialist investigations, stakeholder consultation and the preparation of an ESIA Report together with an ESMP, a SEP and RAP / LRP

The Project may proceed into the ESIA phase where the impacts will be assessed further. The following is specifically recommended:

- Biodiversity surveys including avifaunal monitoring;
- Critical Habitat Assessment to determine the impacts on Critical Habitat, if any;
- Additional stakeholder consultation to inform the social assessment;
- Resettlement Action Plan (RAP) and/or a Livelihood Restoration Plan (LRP); and
- Climate Change Risk Assessment including GHG Emissions Inventory to better quantify the risks or benefits from the Project.

10.3 Assumptions and Limitations

The following assumptions and limitations should be noted in the preparation of this E&S Scoping Report:

- The scope of this investigation is limited to the potential E&S impacts associated with the proposed development of a 200 km OHTL with an assessment corridor of 2 km.
- The E&S Scoping Report has been prepared at a desktop level only and will be updated following field investigations.
- All information provided by RNT and/or their professional team was correct and valid at the time it was provided.
- All data from unpublished research is valid and accurate.

11.0 References

Abotsi, A.K. (2016). *Power Outages and Production Efficiency of Firms in Africa*. *International Journal of Energy Economics and Policy*. 6(1), 98-104.

Angola: People and Society (2024). *The World Factbook*. Retrieved from: <https://www.cia.gov/the-world-factbook/countries/angola/#people-and-society>

Angola Power Sector Long Term Vision. (n.d.). Retrieved from <https://gestoenergy.com/wp-content/uploads/2018/04/ANGOLA-POWER-SECTOR-LONG-TERM-VISION.pdf>

BirdLife International (2016b). *Bucorvus leadbeateri*. *The IUCN Red List of Threatened Species 2016*: e.T22682638A92955067. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22682638A92955067.en>. Accessed on 04 July 2024.

BirdLife International (2020a). *Polemaetus bellicosus*. *The IUCN Red List of Threatened Species 2020*: e.T22696116A172287822. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22696116A172287822.en>. Accessed on 04 July 2024.

BirdLife International (2020b). *Sagittarius serpentarius*. *The IUCN Red List of Threatened Species 2020*: e.T22696221A173647556. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22696221A173647556.en>. Accessed on 04 July 2024.

BirdLife International (2020c). *Terathopius ecaudatus*. The IUCN Red List of Threatened Species 2020: e.T22695289A174413323. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22695289A174413323.en>. Accessed on 04 July 2024.

BirdLife International (2021a). *Aquila rapax*. The IUCN Red List of Threatened Species 2021: e.T22696033A203852137. <https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T22696033A203852137.en>. Accessed on 04 July 2024.

BirdLife International (2021b). *Falco vespertinus*. The IUCN Red List of Threatened Species 2021: e.T22696432A200136196. <https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T22696432A200136196.en>. Accessed on 04 July 2024.

BirdLife International. (2016a). *Balearica regulorum*. The IUCN Red List of Threatened Species 2016: e.T22692046A93334893. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22692046A93334893.en>. Accessed on 04 July 2024.

Burgess, N., Hales, J. A., Underwood, E., Dinerstein, E., Olson, D., Itoua, I., Schipper, J., Ricketts, T., & Newman, K. (2004). *Terrestrial ecoregions of Africa and Madagascar: a conservation assessment*. Island Press.

Climate Change Counts. (2014). *Angola Country Report*. Southern African Regional Universities Association. Retrieved from https://www.adeanet.org/en/system/files/sarua_vol2no1_angola_country_report.pdf

Crook, V. (2013). *Ansellia africana*. The IUCN Red List of Threatened Species 2013: e.T44392142A44437667. <https://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T44392142A44437667.en>. Accessed on 04 July 2024.

CUNENE: Province in Angola. City Population. Retrieved June, 18 2024 from https://www.citypopulation.de/en/angola/communes/admin/16_cunene/

Dean, W.R.J. (2001). Angola. In: Fishpool, L.D.C & Evans, M.I. (eds) *Important Bird Areas of Africa and associated islands*. BirdLife International, Pisces Press.

Deonarain, B., & Montmasson-Clair, G. (2017). *Regional Integration in Southern Africa: A Platform for Electricity Sustainability*.

ESIA ANNA (2020). *Environmental and Social Impact Assessment (ESIA) Report for the Angola – Namibia Transmission Interconnector Project (ANNA)*, Aurecon/Zutari.

Environmental and Social Impact Assessment Guidelines for Transmission Infrastructure for the SAPP Region. (2010). Retrieved from https://www.sapp.co.zw/sites/default/files/ENVIRONMENTAL%20AND%20SOCIAL%20IMPACT%20ASSESSMENT%20GUIDELINES%20FOR%20TRANSMISSION%20INFRASTRUCTUREINFRASTRUCTURE2%20Final%20Sept%202010%20_2_.pdf

European Union (2014). *Diagnóstico de Género de Angola. PAANE II – Programa de Apoio aos Actores Não Estatais*.

Green Climate Fund. (2024). *Enhancing Angola's Access to Climate Finance for Sustainable Transport and Sustainable Landscape (AFOLU) Sectors*. Retrieved from <https://www.greenclimate.fund/sites/default/files/document/20240326-angola.pdf>

Green Climate Fund. (2024). *Enhancing Angola's Access to Climate Finance for Sustainable Transport and Sustainable Landscape (AFOLU) Sectors*. Retrieved from <https://www.greenclimate.fund/sites/default/files/document/20240326-angola.pdf>

Huntley, B. J. (1974). *Outlines of wildlife conservation in Angola*. South African Journal of Wildlife Research 4(3): 157-166.

Huntley, B. J., Russo, V., Lages, F., & Ferrand, N. (Eds.). (2019). *Biodiversity of Angola: Science & Conservation: A Modern Synthesis*. SpringerOpen.

IFC Performance Standards on Environmental and Social Sustainability. (2012). Retrieved June 13, 2024, from <https://www.ifc.org/content/dam/ifc/doc/mgrt/ifc-performance-standards.pdf>

IFC. (2012). *Guidance Note 1: Assessment and Management of Environmental and Social Risks and Impacts*, IFC Performance Standards. Retrieved June 13, 2024, from <https://www.ifc.org/content/dam/ifc/doc/2021/20210614-ifc-ps-guidance-note-1-en.pdf>

INE (2016). *Resultados Finais do Censo 2014 (Final results from the 2014 Census)* http://www.embajadadeangola.com/pdf/Publicacao%20Resultados%20Definitivos%20Censo%20Geral%202014_Versao%2022032016_DEFINITIVA%2018H17.pdf, accessed in 02 July 2024.

INE (2018). *Projeção da População da Provincia do Cunene(Population Projections - Cunene Province)* https://www.ine.gov.ao/Arquivos/arquivosCarregados/Carregados/Publicacao_637586917903064349.pdf, accessed in 02 July 2024.

- INE/GEPE (2020) Anuário de Estatístico Sanitário, Ministério da Saúde - GEPE
https://www.ine.gov.ao/Arquivos/arquivosCarregados/Carregados/Publicacao_638375138220811576.pdf
- Instituto Nacional de Estatística (National Institute of Statistics) (2014). Angola Population Census. Retrieved on June, 19 2024 from <https://www.ine.gov.ao/>
- Integrated Food Security Phase Classification. (2021-2022). Angola: Acute Food Insecurity Situation and Acute Malnutrition Situation April 2021 - March 2022. Retrieved from <https://www.ipcinfo.org/country/en/id/33/>
- International Trade Administration. (2024). Angola - Country Commercial Guide. Retrieved from <https://www.trade.gov/country-commercial-guides/angola-energy>
- Limones, N., Marzo-Artigas, J., Wijnen, M., & Serrat-Capdevila, A. (2020). Evaluating drought risk in data-scarce contexts: The case of southern Angola. *Journal of Water and Climate Change*, 11(S1), 44–67
- Marshall, B.E. & Tweddle, D. (2007). *Oreochromis macrochir*. The IUCN Red List of Threatened Species 2007: e.T63336A12659168. <https://dx.doi.org/10.2305/IUCN.UK.2007.RLTS.T63336A12659168.en>. Accessed on 04 July 2024.
- Meteoblue. (n.d.). Climatological data for Cahama, Angola. Retrieved from https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/cahama_angola_3351307
- Meteoblue. (n.d.). Climatological data for Ondjiva, Angola. Retrieved from https://meteoblue.com/en/weather/historyclimate/climatemodelled/ondjiva_angola_3346821
- Meteoblue. (n.d.). Climatological data for Xangongo, Angola. Retrieved from https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/xangongo_angola_3345492
- Mixed Migration Centre. (2023). Climate and mobility case study: Angola. Retrieved from file:///C:/Users/tdias/Downloads/259_Case_Study_6_Angola.pdf
- Olson, D. M., Dinerstein, E., Wikramanayake, E. D., Burgess, N. D., Powell, G. V., Underwood, E. C., ... & Kassem, K. R. (2001). Terrestrial Ecoregions of the World: A New Map of Life on Earth: A new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity. *BioScience*, 51(11), 933-938.
- Overton, J., Fernandes, S., Elizalde, D., Groom, R. & Funston, P. (2017). A Large Mammal Survey of Bicuar and Mupa National Parks, Angola. Unpublished report commissioned by the National Institute of Biodiversity and Conservation Areas in partnership with the Range Wide Conservation Program for Cheetah and African Wild Dogs.
- Rodrigues, C. U. (2007). From family solidarity to social classes: Urban stratification in Angola (Luanda and Ondjiva). *Journal of Southern African Studies*, 33(4), 793-810.
- Solarin, S. A., Shahbaz, M., & Shahzad, S. J. H. (2016). Revisiting the Electricity Consumption-Economic Growth Nexus in Angola: The Role of Exports, Imports and Urbanization. *International Journal of Energy Economics and Policy*, 6(3), 501–512
- Solarin, S. A., Shahbaz, M., Syed, S. J. H., & Shahzad, S. J. H. (2016). Revisiting the Electricity Consumption-Economic Growth Nexus in Angola: The Role of Exports, Imports and Urbanization. *International Journal of Energy Economics and Policy*, 6(2), 84-91.
- The Energy Year: Angola closes in on its 2022 electrification targets (2022). Retrieved from: <https://theenergyyear.com/articles/angola-closes-in-on-its-2022-electrification-targets/>
- Tweddle, D. & Marshall, B.E. (2007). *Oreochromis andersonii*. The IUCN Red List of Threatened Species 2007: e.T60623A12385801. <https://dx.doi.org/10.2305/IUCN.UK.2007.RLTS.T60623A12385801.en>. Accessed on 04 July 2024.
- UNESCO. (2021). Lei de Bases do Sistema de Educação/Basic Law of Education System. Retrieved from <https://www.unesco.org/education/edurights/media/docs/ab5edaf60f92b4f7e925745f909ae6a6b62bf559.pdf>
- World Bank. (2023). Annual Report. Retrieved June 14, 2024, from <https://www.worldbank.org/en/about/annual-report/our-work>
- World Bank. (n.d.). Guidance Note for Borrowers: ESS1: Assessment and Management of Environmental and Social Risks and Impact. Retrieved June 17, 2024 from <https://documents1.worldbank.org/curated/en/142691530216729197/ESF-Guidance-Note-1-Assessment-and-Management-of-Environmental-and-Social-Risks-and-Impacts-English.pdf>
- World Bank. (n.d.). Meta data glossary. Retrieved from <https://databank.worldbank.org/metadataglossary/millennium-development-goals/series/SE.ADT.LITR.ZS>

