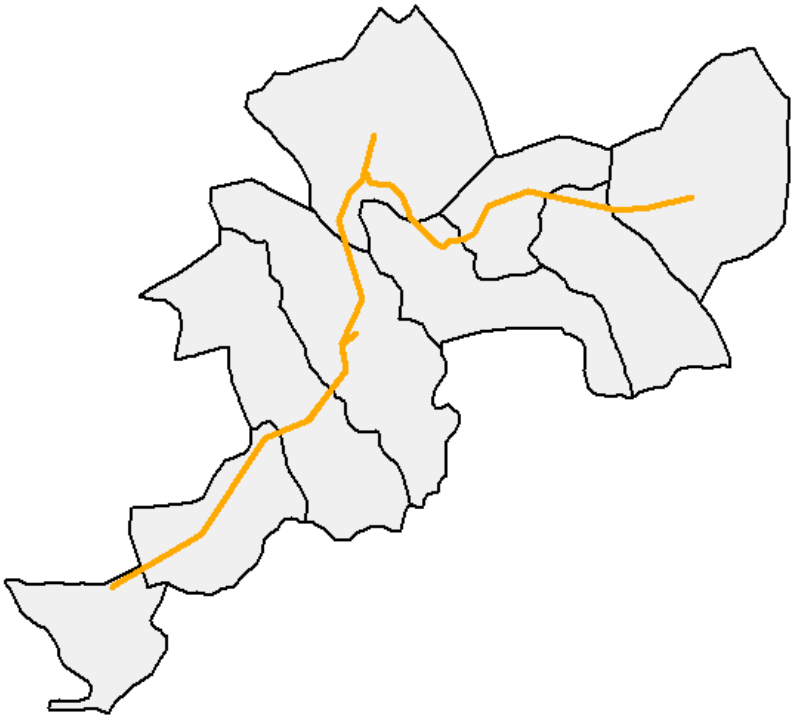

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE ELECTRIFICATION OF UIGE, ANGOLA – LOT 1, PHASE 1

Volume 3 – Non-Technical Summary

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE ELECTRIFICATION OF UÍGE, ANGOLA – LOT 1, PHASE 1

VOLUME 3 – NON-TECHNICAL SUMMARY

Volume 1 – Environmental and Social Impact Assessment Report

Volume 2 – Specialised Studies and Drawings

Volume 3 – Non-Technical Summary

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1. Introduction

1.1. Scope of the report

This report is the Non-Technical Summary (NTS) of the Environmental and Social Impact Assessment (ESIA) of the Uíge Electrification Project – Batch 1, Phase 1 ("the Project"). The Environmental Impact Assessment has been developed to ensure that environmental and social issues are carefully considered and managed throughout the life cycle of the Project.

The Non-Technical Summary aims to summarise the most important aspects of the ESIA and constitutes an essential part of it. As it is developed and written clearly and succinctly in order to be understood by the general public, the NTS ensures that the information comprised in the ESIA is accessible to all.

1.2. Project Background

The government of Angola has defined the overarching objectives of the long-term strategy for 2025, aimed at increasing its population quality of life.

These objectives support themselves on the promotion of human development and the well-being of Angolans, the promotion of equitable and sustainable development, guaranteeing an economic rhythm and developing the national territory in a harmonious and sustainable manner.

In order to achieve these objectives, there is a need for adequate investment in the electricity sector.

The project is framed under the Presidential Decree 177/20 of April, 22nd, regarding transmission lines and distribution of energy from 66 kV and below 66 kV.

The main objective of this project is to supply electricity to the provincial capitals (Uíge) and the headquarters of municipalities and communes. The Project will achieve this through the construction of three new substations (Puri, Rio Dange and Aldeia Viçosa), the expansion of two existing substations (Uíge and Negage) and energy transmission and distribution lines.

1.3. Environmental and Social Impact Assessments

The Environmental and Social Impact Assessment (ESIA) is to **analyse the potential interference of the project** in the biophysical and socio-economic environment.

Subsequently, it proposes **measures to mitigate the negative effects and measures to enhance the positive impact**. Accordingly, it will enable its sustainable implementation in the construction, operation and deactivation phases.

The preparation of the ESIA included the following main activities:

- Description of the affected environment and development prospects;
- Preliminary identification of environmental aspects, i.e., elements of the project likely to result in environmental effects/impacts;
- Identification and analysis of the main potential effects/impacts of the project;
- Classification of the effects/impacts based on pre-established criteria;
- Formulation of measures to mitigate the negative effects/impacts and measures to promote the positive effects/impacts identified;
- Preparation of an Environmental Management Plan containing environmental management measures and monitoring/follow-up of impacts;
- Compilation of technical and/or knowledge gaps;
- Formulation of conclusions and recommendations based on the results of the Environmental and Social Impact Assessment.

1.4. Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) is a complement to the Environmental and Social Impact Assessment (ESIA), which presents a set of mitigation, compensation, monitoring and institutional measures to be adopted in the different phases of the project. The purpose of these measures is to minimise adverse environmental and social impacts and increase the benefits arising from the project.

The Plan consists of a:

- **Occupational Health and Safety Plan:**
  - Drafting a list of potential hazards associated with the project and with mitigation measures for each hazard.
- **Preliminary Waste Management Plan:**
  - Presentation of the appropriate procedure for the different wastes generated in the different phases of the project.
- **Stakeholders Involvement Programme:**
  - Presentation of the activities to be carried out with the different project stakeholders in the three phases of the ESIA (work plan, initial and scoping and detailed assessment of environmental and social impacts and risks).
  - Monitoring programmes for the project's air quality and noise:
  - Planning for activities with the highest potential for dust, inhalable particles and noise emissions;
  - Presentation of mitigation measures to minimise the impacts of exhaust gas, dust and particle emissions and noise.
- **Fauna Monitoring Plan:**
  - Aims to evaluate the effectiveness of the measures adopted, assess the need to change or create new measures;
  - Detect new impacts or direct interactions with the transmission lines for the definition of new mitigation measures, should the need arise.
- **Environmental Education Plan:**
  - Raising awareness and training all stakeholders in this project on the relevant environmental and social aspects.

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2. Description of the project and the alternatives considered

2.1. Need and objective of the project

The energy sector is poorly developed in most provinces of Angola, particularly in rural and isolated urban areas. This project will contribute to increasing the population with access to the national electricity grid in the province of Uíge.

The main objectives of the project are to provide 5 000 households with electricity from the national grid and to provide street lighting to the headquarters of municipalities, communes and villages covered by the study area. In this way, the project will reduce the population's dependence on the use of generators and, consequently, minimise emissions from their use.

Another important contribution of the project for the province of Uíge is the potential development of the province's municipalities through the provision of infrastructure that will provide a favourable context for attracting investment and generating employment in sectors such as agriculture, commerce, hotels and industry.

The project will also play an important role in achieving the goals for the energy sector as well as the reduction of GHG emissions defined by the government in the Plan "Angola Energy 2025 – Long-term vision for the Energy Sector" and the "National Strategy for Climate Change Angola (2018-2030)", respectively.

2.2. Project location

The Project for the Electrification of Uíge is located in the Northern Region of Angola, in the Uíge Province and includes a small area of the Bengo Province (Figure 1). It extends for about 230 km, crossing several municipalities and communes of the Uíge Province, these being:

- Uíge Municipality, Uíge Commune;
- Negage Municipality, Kisseke, Negage and Dimuca Communes;
- Puri Municipality, Puri Commune;
- Quitexe Municipality, Quifuafua, Quitende and Quitexe Communes.

In the Bengo Province it integrates the Municipality of Dembos, Kibaxe Commune.

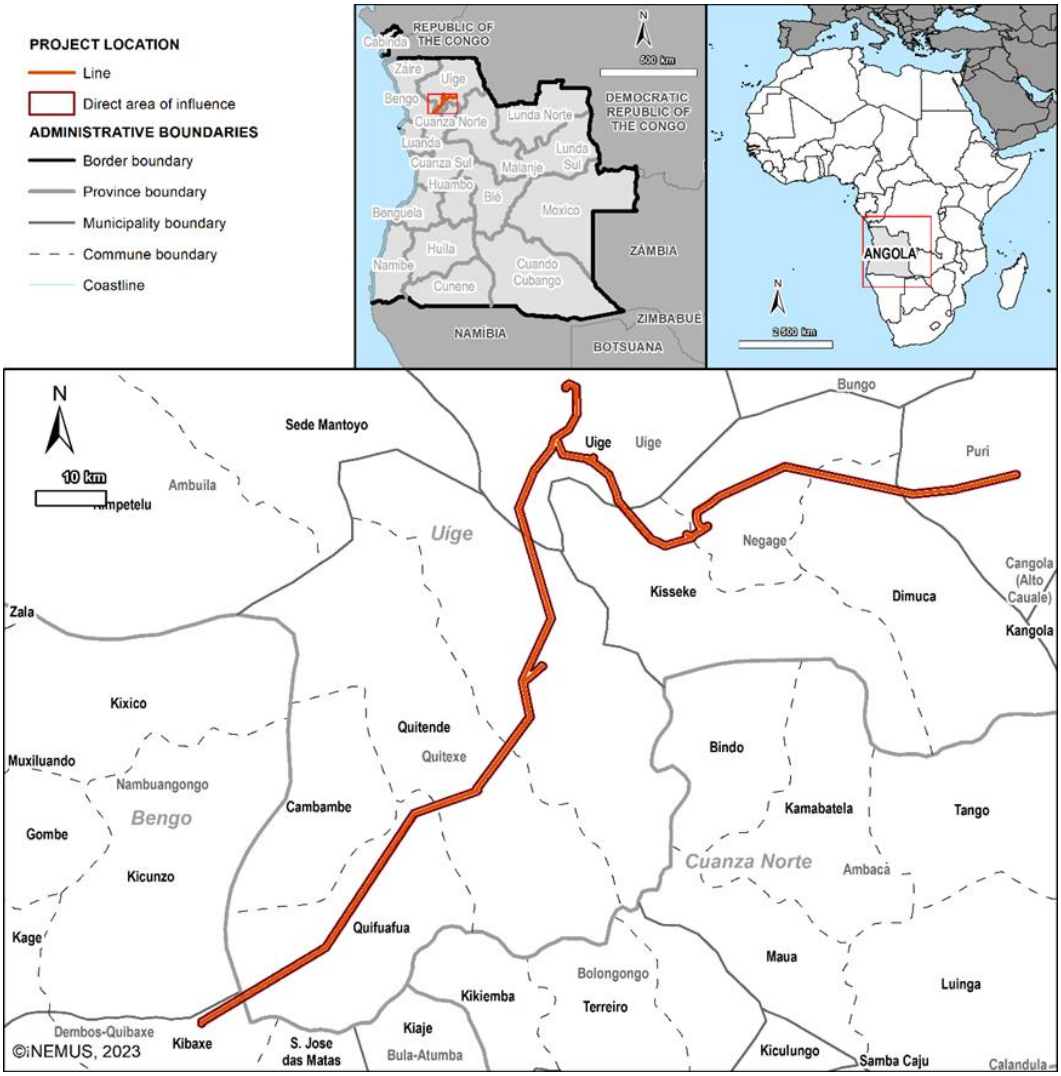

Figure 1 – Location of Electrification Project of Uíge Province – Lot 1, Phase 1

2.3. General characteristics

The Project for Electrification of Uíge – Batch 1, Phase 1 includes the extension of 2 substations (Uíge and Negage), the construction of 3 other new substations (Aldeia Viçosa, Dange River, Puri), the execution of 230 km of transmission lines (110; 60 and 30 kV) and 5 000 household connections and public lighting.

The project includes the studies, design, manufacture, transport, insurance, construction, assembly, reception and test works of the components listed in Table 1.

Table 1 – Project components

	Name	Specification
Substations (SS)		
New	SS of Aldeia Viçosa	110/60/30 kV (1x40 MVA)
	SS of Dange River	60/30 kV
	SS of Puri	60/30 kV
Extension	SS of Uíge	2x60 kV line panels
	SS of Negage	2x110 kV line panels and 1x60 kV line panel
Transmission Lines		
110 kV	Uíge – Aldeia Viçosa (55 km)	Single circuit with ACSR 326 mm^2 BEAR
60 kV	Aldeia Viçosa – Dange River (75 km)	Single circuit with ACSR 326 mm^2 BEAR
	Negage – Puri (55 km)	
30 kV	Aldeia Viçosa – Quitexe (15 km)	Single circuit with ACSR 157,92 mm^2 Partridge
	Interconnection between Negage and the villages of Cangundo, Piqui, Dambi, Calumbo and Quiongua (30 km)	
Household connections and public lighting		
-	Quitexe and adjoining villages	1 500 household connections
-	Aldeia Viçosa	500 household connections and public lighting
-	Villages of Cangundo, Piqui, Dambi, Calumbo and Quiongua	2 000 household connections
-	Puri and adjoining villages	1 000 household connections and public lighting

Table 1 shows the specifications for the different components of the project. New substations such as the Aldeia Viçosa substation, Rio Dange substation and the Puri substation include the supply, installation, testing and commissioning of an air-insulated substation.

The substation of Aldeia Viçosa will have sections for the intersections with the 110; 60 and 30 kV transmission lines, while the substations of Rio Dange and Puri have intersections for 60 and 30 kV.

Regarding the expansion of the Uíge and Negage substations, it consists of the construction of 100 kV and 60 kV line panels, including supply, installation, testing and commissioning.

The following figure shows the route of the transmission lines between the project substations. The 100 and 60 kV transmission lines of the project have a single circuit with ACSR 326 mm^2 BEAR type conductor cable. The 30 kV transmission lines are single circuit like the 100 and 60 kV lines but the ACSR 157,92 mm^2 Partridge conductor cable is thinner.

The 100 kV electric line between the existing substation of Uíge and the new substation of Aldeia Viçosa has a total length of 55 km, while the 60 kV line connecting the new substations of Aldeia Viçosa and Rio Dange is 75 km long.

On the other hand, the extension between Negage and Puri is 55 km long. The 30 kV transmission lines are divided into two extensions, one between the substation of Aldeia Viçosa and Quitexe and the other between Negage and the villages of Cangundo, Piqui, Dambi, Calumbo and Quiongua, with 15 km and 30 km respectively.

The implementation of the project's infrastructures will require various temporary infrastructures, namely access roads and temporary areas for the assembly of towers.

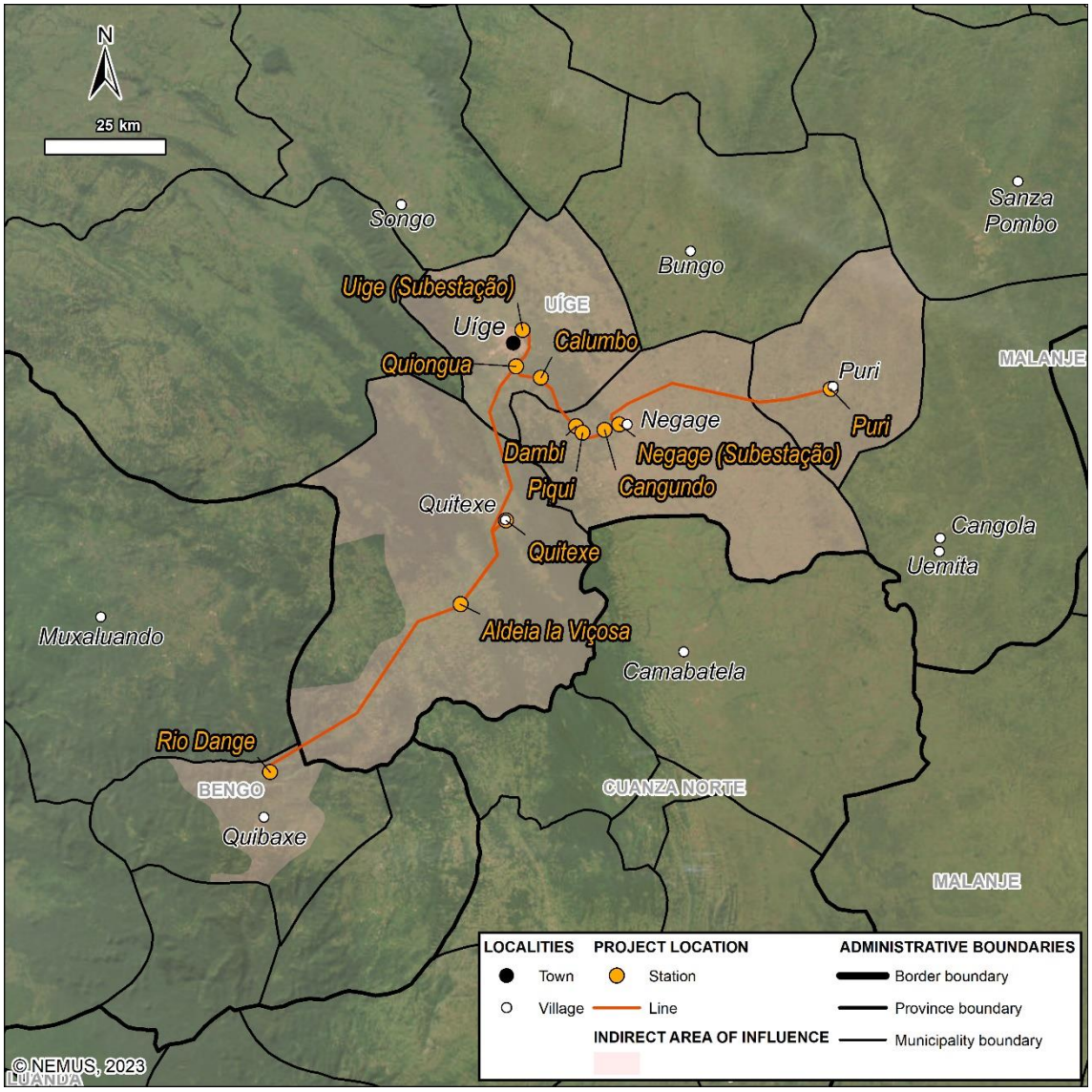

Figure 2 – Implementation and components of the Electrification Project of Uíge Province – Lot 1, Phase 1

2.4. Project design guidelines

The Project final layout was projected based on both national and international regulations and best practices. When there are no national standards that address certain issues, international guidelines are applied, namely the International Finance Corporation (IFC) Performance Standards on the Environmental and Social Sustainability and the Environmental, Health and Safety Guidelines.

2.5. Time schedule

The phase of Batch 1 total construction is **expected to last 15 months**, distributed as follows:

- 110 kV Uíge-Aldeia Viçosa transmission line – 452 days;
- New substations (SS) of Puri, Rio Dange and Aldeia Viçosa, and expansion of the SS of Uíge and Negage – 452 days;
- 60 kV Negage-Puri transmission line – 424 days;
- 60 kV Aldeia Viçosa-Rio Dange transmission line – 250 days;
- Aldeia Viçosa- Quitexe 30 kV transmission line – 221 days;
- 30 kV transmission line to connect Negage to the villages of Cangundo, Piqui, Dambi and Calumbo to Quiongua – 265 days.

3. Summary of the biophysical and socio-economic characterisation

This chapter presents a summary of the biophysical and socio-economic characterisation of the project's influence area (Table 2). This summary refers to the description of the affected environment of the project site for each descriptor addressed by Volume 1 of the Environmental and Social Impact Assessment.

Table 2 – Summary of the biophysical and socioeconomic characterisation

Subject	Characterisation summary
Climate	• The project is located in a region classified as having a tropical savannah **climate**, characterized by average temperatures in the coldest month of more than 18 ºC. • In Uíge, the average monthly air temperature varies between 20 ºC and 25 ºC. The summer months (from May to September) are particularly dry due to high temperatures and low precipitation values. The winter months (October to April) are characterised by high precipitation. The average annual precipitation between 2000 and 2021 was 1 443 mm.
Geology, geomorphology, and topography	• The **geology** of the project covers mainly Precambrian metasedimentary rocks, over which sedimentary rocks with ages ranging from the Mesozoic (Cretaceous) to the Tertiary are deposited, which outcrop in the extreme northeast. • Regarding **geomorphology**, the project covers 2 of the 11 geomorphological units in which Angola is subdivided: the Escarpment zone and the Congo Peneplain. • The region presents a high **topography**, with approximately 84 % of the territory at more than 700m altitude. About 67 % of the study area has a gentle to wavy relief. The flat areas occupy approximately 24 % of the territory under study, while 10 % is moderately accentuated (> 25 %).

Subject	Characterisation summary
Mineral resources	• Angola has significant potential for **mineral resources**, most of which are related to the Precambrian subsoil. • In the project's area of influence, no mining operations or quarries for the exploitation of geological resources have been identified.
Natural disasters	• The project area presents a low risk of **seismicity**. • In the provinces covered by the project, the relief is classified as gentle to undulating and the flattened areas make the susceptibility to **slope instability** low to very low.
Hydrogeology	• It is possible to identify two different types of **hydrogeological units**: fractured aquifers, related to the oldest rocks in the country, and porous aquifers, related to unconsolidated Quaternary/Alluvial sediments.
Surface water resources	• With regard to **surface water resources**, the project's area of influence covers the Dande, Northwest and Lower Kwanza and Cuango hydrographic units. • **Water uses** comprise human supply, irrigation and livestock, with urban supply predominating, with the exception of the Dande Hydrographic Unit, where the main use of water is for irrigation. • Due to the urban occupation of the banks, during the rainy season, local flooding is also recorded along the water lines in the municipality of Uíge.
Soils and Land use	• Umbric Ferralsols, Xanthic Ferralsols and Ferralic Arenosols are the **soils** that predominate in the region. • Tree cover and grassland areas are the main **land use** classes.
Quality of the environment	• There is a worse **air quality** in urban areas compared to rural areas (mostly covered by the project), due to the higher frequency and intensity of air pollutants such as road traffic, biomass burning and the use of generators. • The **noise** monitoring carried out under the project shows that the local sound environment is affected by road traffic and people's daytime activities, in a more intense way in urban and peri-urban areas than in rural areas, compromising the well-being of the populations concentrated there.

Subject	Characterisation summary
Ecology	• In terms of **ecology**, it should be noted that the project's direct area of influence is located in a transition zone between the tropical rainforest region and the arid Zambezian region. The landscape is largely anthropized and is currently dominated by savannah vegetation. • Formations of greater complexity and ecological value, such as the Quitexe coffee forests, gallery forests and wetlands. • The project has a potential effect on the orange-breasted shrike (*Laniarius brauni*), an endemic and globally endangered species with a very restricted known distribution.
Socioeconomics and Human Rights	• With regard to **socioeconomics and human rights**, the rurality of the province of Uíge, where various agriculture, animal production, hunting, forestry and fishing businesses are concentrated, should be noted. • It is estimated that about 28,4 thousand people live in the project area. Approximately 80 % of the households in the settlements affected by the project are socially vulnerable, as most are heavily dependent on the land for subsistence and income generation, and have low monetary incomes. • In Uíge province, only 17 % of the population has access to the public power grid and uses energy for lighting. • Living standards in Angola, in general, and in rural areas, in particular (as is the case in the project's area of influence) are unsatisfactory, so that the right to an adequate standard of living (including access to health care, food and adequate housing), the right to education, and workers' rights are compromised and limited.
Cultural heritage	• Despite the rich **cultural heritage** of the country, near the corridor of the project, along the EN120, between Aldeia Viçosa and Quitexe, only the Lagoa do Feitiço, a place identified as intangible heritage, stands out.

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4. Identification and Evaluation of Environmental and Social Impacts

This is one of the most critical phases of the Environmental and Social Impact Assessment, through which the main effects/impacts of the project are identified and assessed. The main objective is to identify the environmental, social and heritage impacts associated with the project on and around the site, including direct and indirect, short and long-term impacts, focusing on both positive and negative impacts associated with the different phases of implementation.

The effects/impacts of the project were assessed using certain criteria, resulting in the prediction of their significance: the value of an impact is understood to be positive (enhancement of the environment), negative (devaluation) or nil (no effect); the significance of an impact translates the ecological, environmental or social ecological, environmental or social significance (ranging from negligible to high significance) this is the most important descriptive criterion. Significance is influenced by other assessment criteria, particularly the regional extent, duration, likelihood and intensity of the impact.

Table 3 – Impact significance criteria presents the criteria used in the ESIA for the classification of the significance of project effects/impacts.

Table 3 – Impact significance criteria

Significance criteria	
Negligible significance	An impact of *negligible significance* is where the magnitude is negligible or low and the likelihood of the impact occurring is unlikely, or the magnitude is negligible and the impact probability is likely or definite.
Low significance	An impact of *low significance* is where the magnitude of the impact is low but the likelihood is probable or definite, or where the magnitude is moderate but the probability of occurrence is unlikely.
Moderate significance	An impact of *moderate significance* is where the magnitude is medium, and the probability of the impact occurring is likely or definite, or the magnitude is high but the probability is unlikely.
High significance	An impact of *high significance* is where the magnitude of the impact is high, and the probability of the impact occurring is likely or definite.

For the construction phase of the project, 26 impacts were identified, of which 24 are negative impacts and 2 are positive impacts. The high number of negative impacts is related to construction activities, such as deforestation, excavations, vehicle traffic in the project area, operation of machinery and equipment, among other activities.

These actions will cause the following **negative impacts**, mostly temporary:

- Changes in the structure of the land surface and local forms due to excavations and embankments, affecting the groundwater infiltration area and soil erosion.
- Loss of access to land and crops;
- Loss of areas occupied by animals and plants and where they live, can find food, shelter, protection and reproduce;
- Disturbance of animals;
- Noise and dust emission;
- Emissions of gases that contribute to climate change;
- Pollution of surface water, groundwater and soil due to possible accidental spillages of contaminating substances;
- Different impacts on local communities (temporary loss of livelihood due to occupation/impeded access to farmland, affecting the safety and health of people close to the works, increased transmission of diseases in the local community due to increased interaction with workers);
- Interference with cultural heritage that is not currently recorded and which may be identified during the works (e.g., traditional burial grounds).

To minimise the negative impacts of this phase of the project, a list of mitigation measures is presented with the objective of reducing the intensity and significance of the impacts.

Positive impacts will also be registered during the construction phase, mainly at the socioeconomic level, namely through the temporary creation of jobs and new opportunities for local businesses in terms of local income, increased commercial activities, the empowerment of local contractors and suppliers, among other indirect benefits. The construction will create about 280 jobs in total, 210 for the electrification of the municipalities and 70 for the home connections and public lighting (direct and indirect labour needed).

The operation phase will clearly bring the main **positive impacts** of the project, mostly associated with socioeconomic aspects, but also some contributing to climate change mitigation. These impacts result from:

- Reduction of greenhouse gas emissions contributing to climate change due to increased electricity consumption in Uíge Province;
- Increased local employment opportunity generated by the need to maintain the transmission line corridor and associated infrastructure;
- Increase in community safety after mine-clearance;
- Increased safety and comfort of the population with public lighting;
- Increased electrical capacity and benefits related to a more stable and secure electricity supply;
- Benefits for local settlements arising from the improvement of road infrastructures by allowing greater road safety and better access to education, employment, health, among others.

In the operation phase of the project, it is expected that a few **negative impacts** will occur:

- Thinning and deforestation of vegetation with degradation of conservation status/fragmentation/loss of areas occupied by animals and plants and where they live, can find food, shelter, protection and reproduce;
- Disturbance to animals (mammals and birds) due to the risk of electrocution and collision with the transmission line and increased human pressure;
- Restrictions to land use and loss of livelihood due to occupation/impeded access to farmland;
- Noise generated by substations and electrical discharges from transmission lines.

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5. Mitigation and Compensation Measures

For a good environmental performance of the project, it is essential that in all phases of the project where negative effects/impacts were identified, mitigation measures are implemented and positive effects/impacts are enhanced.

In the Environmental and Social Impact Assessment general mitigation measures are presented, mainly related to the construction activities, namely with the management of the construction yard, machinery operation, transport and execution of the works. Most of these measures correspond to recommendations on good environmental practices and on the strategy thought to be the best to guarantee the sustainable implementation of the project.

Of all the proposed measures, the following have the greatest benefit for the interests of the communities surrounding the project area and their environment:

- Promote afforestation in the area surrounding the project with the same area of forest vegetation removed due to the project, considering a vegetation adapted to the local climate and efficient as a carbon sink;
- Vegetation clearing and soil disturbance should be minimized and should not extend beyond the corridor or substation site;
- Reduce the level of landscape fragmentation, safeguarding the continuity of ecological systems;
- If there is any excavation waste during the construction phase, it is recommended that it be deposited in disused quarries or used for the recovery of degraded areas in the vicinity of the project;
- Installing bird deterrents to reduce the risk of collision in the most sensitive areas for birds of the Guinea-Congolese biome, and for the Braun's shrike;
- Whenever possible, avoid felling or affecting priority trees for the conservation of biodiversity;
- Strengthen the monitoring and maintenance of the line in areas where primates potentially occur;
- Carrying out actions to raise workers' awareness about the prevention of pollution of surface water resources during construction operations;
- Planning activities with the highest potential for the emission of dust and inhalable particles and noise to take place as far away as possible from sensitive receptors (places where people live or stay);

- Ensure the hiring of workers from rural communes in the direct catchment area whenever possible for the project's construction activities, thus contributing to reduce local unemployment and boosting local economies;
- Elaboration of an Action to Sensitise workers to the cultural heritage. The different types of heritage that may occur in the construction area should be explained, as well as their cultural value, the actions that lead to their destruction and the risks that their destruction will cause to the identity of the local community or to the country itself;
- Economic compensation for the loss of income opportunities from seasonal and permanent crops, as well as the loss of community resources such as firewood and charcoal collection;
- Sealing off access to traditional burial grounds and sacred forests that may be identified in the course of the works.

In the specific case of Ecology, since a potentially significant negative impact has been identified, the disturbance and deterioration of animal populations during the operation phase, the implementation of a monitoring programme is proposed with the objective of monitoring the number of birds killed due to collisions or electrocutions caused by the presence of the power line, as well as detecting new impacts.

6. Conclusions

The ESIA concludes that the project is viable from an environmental point of view, presenting a set of **positive effects/impacts of moderate to high significance**, constituting an opportunity for social and strategic development.

The positive impacts are mainly associated with the operation phase, with the increase in electricity capacity and the benefits inherent in a stable and secure supply of electricity and public lighting, the creation of jobs, the stimulation of economic activities, but also by the project's contribution to mitigating climate change due to the substitution of electricity generated from fossil fuels (diesel) by electricity generated from hydroelectric plants with lower greenhouse gas emissions.

Although negative environmental and social impacts have been identified in the construction and operation phases, these are generally minimizable.

The ESIA indicates a greater number of negative effects/impacts during the construction phase, most of them temporary and mitigable with the implementation of the proposed mitigation measures. Most of the recorded impacts are common to any construction work of this nature, such as the emission of noise and dust, the affectation of plots of land or local increase in traffic, so that the adoption of the set of general mitigation measures usually applicable to construction works, as well as the implementation of specific measures presented by the different factors assessed, will be essential to ensure the implementation of the project within a framework of environmental sustainability.

The most significant negative impacts result from the elimination/loss of forest areas along the corridors intended for the protection of structures and cables, but also by the disturbance of animals due to human presence and by an increased risk of electrocution and collision with the lines.

Negative impacts related to restrictions on land use and loss of livelihoods due to occupation/impeded access to farmland were also identified, in most cases mitigable, and therefore of low significance, if the measures recommended in the Environmental and Social Impact Assessment are adopted.

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