

Republic of Benin
Société Béninoise d'Energie Electrique

Environmental and Social Impact Assessments

Non-Technical Summary

Energy distribution project Mono, Couffo, Borgou (PEDER_ Plus)



Project funded by

The French Development
Agency

The European Bank for
Reconstruction and Development

European Bank Investment

The European Union

ABE	Agency Beninese for the Environment
ABERME	Benin Agency for Rural Electrification and Energy Management
AFD	French Development Agency
ANDF	National Land and Property Agency
APD	Preliminary Detailed Design
APS	Preliminary Draft Design
BAD	African Development Bank
BEI/EIB	European Bank Investment
BERD/EBRD	European Bank for Reconstruction and Development
BM/WB	World Bank
BT	Low Voltage Network (less than 1kV)
CEB	Benin Electricity Community
CCES	Environmental and Social Compliance Certificate
IEC	International Electrotechnical Commission
CGES/ESMF	Environmental and Social Management Framework
CNSS	National Social Security Fund
CAD	Tender Dossier
DDCVT	Departmental Directorate for Living Environment and Transport
DDEEM	Departmental Directorate of Energy, Water and Mines
DDTFP	Departmental Directorate of Labour and Public Service
DGDU	General Directorate of Urban Development
DGEFC	General Directorate of Water, Forests and Hunting
DGHC	Directorate General for Housing and Construction
DP/RFP	Request for Proposal
DUE	Delegation of the European Union
E&S	Environment and Social
EAS	Endocrine Active Substances
EIES/ESIA	Environmental and Social Impact Assessment
FAT	Factory Acceptance Test
GIZ	Gesellschaft für Internationale Zusammenarbeit
HS	Sexual harassment
HTA	Medium voltage networks (between 1 kV and 50 kV)
HTB	High voltage networks (above 50kV)
IACM	Manual Cut-Off Switch
IF	Forestry Inspection
IGN	National Geographic Institute
KE	Key Expert
kVA	kilovolt-ampere
MTE	Epidemic and/or Endemic Communicable Disease
MOE	Project Management
NES	Environmental and Social Standard
NGO	Non-Governmental Organization
OPEX	Operating expenses
PAP	People affected by the Project
PARK	Resettlement and Compensation Action Plan
PCB	Polychlorinated Biphenyls
PEDER	Electrical Network Extension and Densification Project
PAE	Environmental Action Plan
P2AE	Energy Access Increase Project
PEDER	Project for the Extension and Densification of the Electrical Networks of the Benin Electricity Company
PEPP/SEP	Stakeholder Engagement Plan
PGES/ESMP	Environmental and Social Management Plan
PGSS/HSMP	Health and Safety Management Plan

PISG	Social Inclusion and Integration Plan: Gender and Human Trafficking
SMEs	Small and Medium-Sized Enterprises
PMI	Small and Medium Industries
NPE	National Environmental Policy
PNPG	National Gender Promotion Policy in Benin
POG	Gender Objectives Policy
PRERA	SBEE Network Rehabilitation and Extension Project in the Atlantic Department
PRESREDI	Project for the Restructuring and Extension of the Distribution and Supply System
SAT	Site Acceptance Test
SBEE	Benin Electricity Company
SE4All	Sustainable Energy for All or Sustainable Energy for All
SE6	sulfur hexafluoride
SIG	Geographic Information System
SIRAT	Road Infrastructure and Land Development Company
SNDD	National Sustainable Development Strategy
TDR	Terms of Reference
TRE	Rate of Economic Return
TRF	Financial Return Rate
VAN	Net Present Value
VBG	Gender-Based Violence
EU	European Union
ZID	Area of Direct Influence
ZII	Indirect Influence Zone

(i) Project context and EIA objectives

❖ Project context

The current electrification situation in Benin is encouraging but still presents numerous challenges. Despite efforts undertaken in recent years, the national electrification rate is progressing slowly, standing at 34.14% nationally, 59.90% in urban areas, and 8.15% in rural areas (DPER-SIE, December 2023). To achieve the Beninese government's objective of 100% electrification by 2030, the Transport and Distribution Master Plan and the National Electrification Strategy of Benin, developed in 2021 and 2022, recommended in their studies that electrification efforts be primarily carried out through network extensions (2.1 million connections will be needed, with more than 50% coming from extensions and densification of the existing network).

SBEE, as part of its action and development program for distribution networks, has identified the PEDER+ project as a priority. This project aims to improve access to electricity at a lower cost through the expansion and densification of the electricity network, as well as increasing its reliability in the project area. The departments and municipalities selected for this study are as follows:

- Mono Department: Municipalities of Athiémé, Bopa, Comè, Grand-Popo, Houéyogbé, Lokossa
- Department of Couffo: Municipalities of Aplahoué, Djakotomey, Dogbo, Klouékanmey, Lalo, Toviklin
- Borgou Department: Communes of Parakou, Tchaourou, N'dali

Electrification of these departments will also allow the development of economic activity in these areas (e.g., activity around cotton cultivation – ginning plant in Borgou ; development of tourism in Mono; agriculture and crafts in Couffo).

It should be noted that the project follows several projects already funded by the European Union. Indeed, the EU, the EIB, and the AFD have been technical and financial partners in Benin's energy sector for several years, notably through the "Energy Facility" project, co-financed by the EU, the AFD, and GIZ for a total of approximately €20 million, which enabled the rural electrification of 105 localities between 2007 and 2014. SBEE implemented a project (currently being closed) co-financed by the AFD (€20 million), the EIB (€18 million), and the EU (€20 million) for the densification, rehabilitation, and extension of the distribution network in the Atlantique Department (PRERA), as well as the DEFISSOL project, amounting to €60 million (€50 million AFD and €10 million EU), for the construction of a 25 MWp solar power plant in the municipality of Pobè. (This power plant was commissioned on July 19, 2022) and the complete rehabilitation/modernization of SBEE's IT network. SBEE also initiated the PEDER and FORSUN projects, co-financed by the AFD and the EU, which also include components for extending SBEE's electricity distribution network.

The PEDER+ project was pre-defined (pre-feasibility level) in 2021 and includes the following components:

- A component of network expansion and densification in the municipalities of N'dali , Parakou and Tchaourou in the Borgou department, and in all the municipalities of the Mono and Couffo departments;
- A component for the rehabilitation and standardization of the MV and low-voltage substations and lines in the project area;
- A component for inserting manual and remote-controlled switching devices onto the electrical network present in these three departments;
- A component for inserting communicating and non-communicating fault detectors on the electrical network present in the project area;
- A component involving the implementation of connections and the installation of public lighting fixtures;
- A capacity building component for staff (Design Office Engineers, Planning Engineers, Project Management, Network Operators, Environmental Specialists).

The project therefore aligns with international commitments, particularly those of the SE4All initiative, namely: i) the promotion of renewable energy (the project, even though it is not a renewable energy power plant construction project , must consider the possibilities of limiting thermal power generation), ii) access (electrification of new localities – target electrification rate of 100% by 2030), and iii) energy efficiency (the project will address improving grid quality, limiting losses, and reducing undistributed energy). This project is also crucial for the Team Europe initiative entitled "Promoting Green, Sustainable and Inclusive Growth in Benin," which coordinates the interventions of European partners in the energy sector in Benin.

The implementation of the various arrangements mentioned above, although contributing to the achievement of the project's objectives, which is to increase the electrification rate in the Republic of Benin, will generate both environmental and social impacts that must be understood in order to propose measures for their management.

In view of the characteristics of the different ecosystems that will be crossed by the power lines to be built and in order to remain in compliance with Article 86 of Law-98-030 of February 12, 1999, the Framework Law on the Environment in the Republic of Benin, which states: "No one may undertake developments, operations, installations, plans, projects and programs or the construction of works without following the environmental impact study procedure, when the latter is required by laws and regulations," given the nature of the project's activities, it is necessary to carry out a thorough environmental and social impact study of this project, in order to comply not only with the requirements of the updated general guide for carrying out EIAs in Benin of 2023 (Annex VII: Energy industry – VII.9: Construction or relocation of an energy transmission and distribution line) but also and above all to ensure the environmental and social compatibility of the project with its host environment becomes an obligation.

This study provides relevant information on the socio-environmental issues related to all activities of the upcoming construction project and proposes measures to mitigate impacts while taking into account the environmental and social considerations of the area where the project will be located. The results of these studies are submitted to the Benin Environmental Agency (ABE) for validation in order to obtain the Environmental and Social Compliance Certificate (CCES).

❖ Objectives of the EIES

The implementation of this project may significantly affect the natural environment and people, depending on the scale of the activities and the environments in which they take place. Therefore, this project is subject to a comprehensive Environmental and Social Impact Assessment (ESIA) during the preliminary design phase (APD) in order to identify, analyse, and evaluate the main environmental and social issues, as well as the potential environmental and social impacts and risks associated with these issues that could arise during the project's life cycle, and to propose appropriate measures to prevent and mitigate these impacts and risks deemed significant.

In reality, the EIES helps to guide project activities so that environmental and social issues are taken into account and well managed before, during and after the execution of the work.

This study was based on national legal and regulatory provisions, in particular Law No. 98-030 of February 12, 1999, the framework law on the environment in the Republic of Benin, Decree No. 2022-390 of July 13, 2022, concerning the organization of environmental and social assessment procedures in the Republic of Benin, the environmental and social safeguard requirements of the World Bank (PS 1 to 6, 8 and 10) and those of the AFD .

❖ Project categorization

The project has been categorized as "B" according to the Environmental and Social Policy (2024) of the European Bank for Reconstruction and Development (EBRD).

The project will meet the following Environmental and Social standards:

- The EBRD's Environmental and Social Requirements (2024)
- The EIB Environmental and Social Standards (2022)
- The World Bank's General Environmental, Health and Safety Guidelines (2017)

❖ Technical description of the project

The Modernization, Extension and Densification of the Electricity Network project in the Mono and Mono departments (PEDER+) in Benin aims to improve access to electricity at a lower cost through the extension and densification of the electricity network as well as the reliability of the electricity network in the project area.

The PEDER+ project was pre-defined (pre-feasibility level) in 2021 and includes the following components:

- A component of extension and densification of the networks in the Municipalities of Lokossa, Comè and Bopa of the Mono department;
- A component for the rehabilitation and standardization of the MV and low-voltage substations and lines in the project area;
- A component for inserting manual and remote-controlled switching devices onto the electrical network present in these three departments;

- A component for inserting communicating and non-communicating fault detectors on the electrical network present in the project area;
- A component for making the connections;
- A capacity building component for staff (Design Office Engineers, Planning Engineers, Project Management, Network Operators, Environmental Specialists).

■ Description of the work

The project for the Modernization, Extension and Densification of the Electrical Network, the component which is the subject of this study, aims at the densification and extension of electrical networks in twelve (12) municipalities distributed across three (03) departments as follows:

- Mono Department: Municipalities of Athiémé, Bopa, Grand Popo, Comè, Houéyogbé, Lokossa
- Department of Couffo: Municipalities of Aplahoué, Djakotomey, Dogbo, Klouékanmey, Lalo, Toviklin
- Mono Department: Municipalities of Comè, Bopa, Lokossa

Electrification of these departments will also allow the development of economic activity in these areas (e.g., activity around cotton cultivation – ginning plant in Mono; development of tourism in Mono; agriculture and crafts in Couffo).

This project takes into account the following components: **component 1**: Extension of the distribution network, **component 2**: Densification of the distribution network, **component 3**: Rehabilitation/standardization of MV & low-voltage substations and lines, and **component 4**: Installation of MV network equipment

Components of the Project in Mono

The planned works in the Mono department include, among other things:

- the construction of 140 km of medium-voltage power lines
- the construction of 1,130 km of low-voltage lines
- the installation of 290 transformer stations
- the completion of 27,698 single-phase and three-phase connections

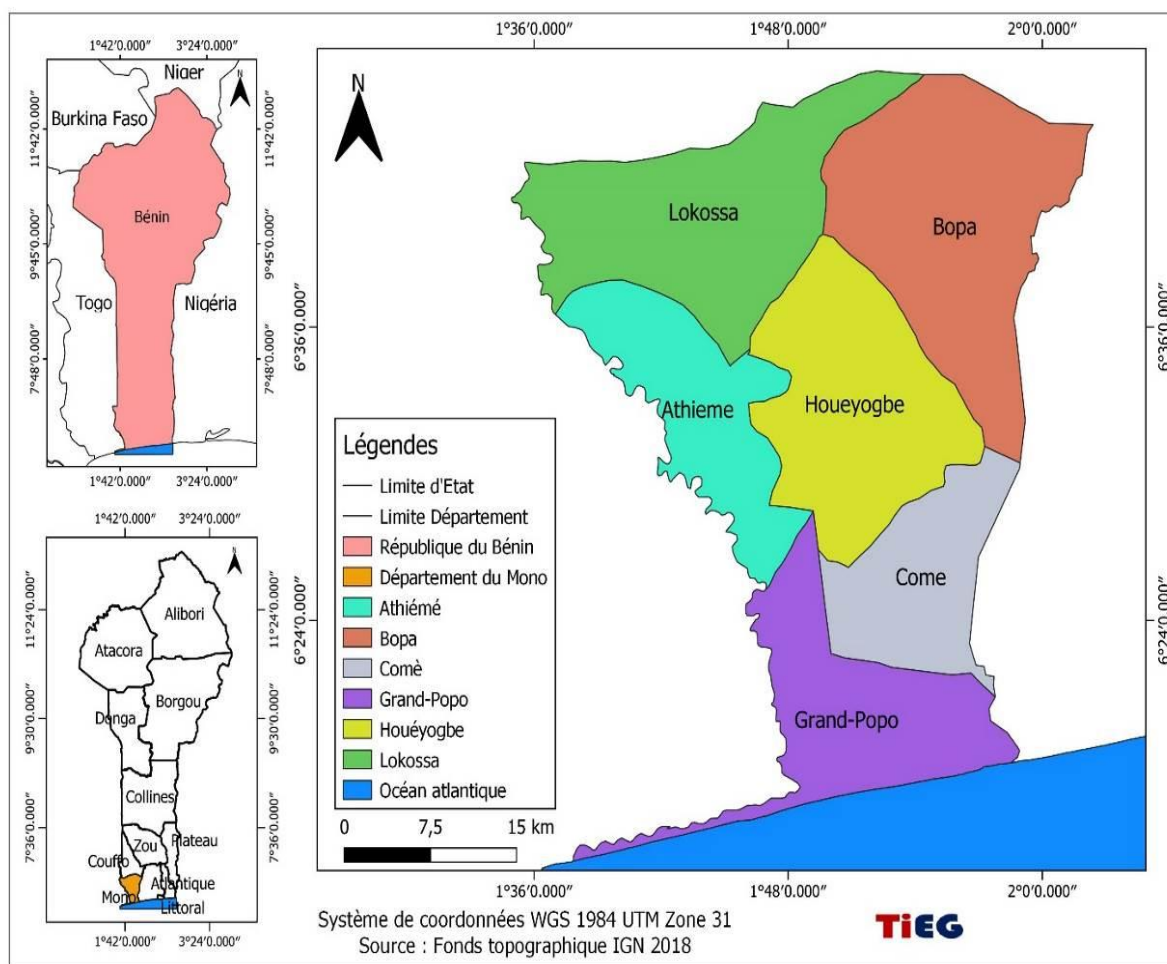


Figure A Geographical location of the municipalities served by the project (Mono)

In the Mono Department, the PEDER+ project takes into account all six (06) Communes of Mono and covers three hundred and twenty-four (324) localities.

However, this study concerns seventy-four (74) localities in the Communes of Comè, Bopa, Houéyogbé, and Lokossa. To this end, the planned work in these 74 localities distributed across the aforementioned communes is as follows:

🔧 For the Commune of Comè

- the construction of approximately 1.605 km of overhead medium-voltage lines;
- the construction of approximately 60,660 km of overhead low-voltage (3x50) lines;
- the construction of approximately 32.418 km of overhead low-voltage (3x70) lines;
- the laying of 4.102 km of BT line;
- the construction of 07 160 kVa transformer stations and one (01) 250 kVa transformer station.

🔧 For the Commune of Bopa

- the construction of 27.261 km of overhead medium-voltage lines;
- the construction of 104.529 km of overhead low-voltage (3x50) lines;
- the construction of 37.153 km of overhead BT(3x70) lines;
- the laying of 1,300 km of BT lines;
- the construction of 20 transformer poles of 100 kVa, 4 transformer poles of 160 kVa and 01 transformer pole of 250 kVa

🔧 For the Municipality of Houéyogbé

- the construction of 1,305 km of overhead HTA lines;
- the construction of 13,859 km of BT (3x50) overhead lines;
- the construction of 8,969 km of BT (3x70) overhead lines;

- the construction of one (01) transforming station of 160 kVa.

🗺 For the Municipality of Lokossa

- the construction of 2,569 km of overhead HTA lines;
- the construction of 18.924 km of overhead low-voltage (3x50) lines;
- the construction of 7.348 km of overhead low-voltage (3x70) lines;
- the laying of 0.787 km of BT lines;
- the construction of 03 100 kVa transformer stations and 02 160 kVa transformer stations.

Components of the Project in the Couffo

The planned works in the Couffo department include, among other things:

- the construction of 600 km of medium-voltage power lines
- the construction of 1,120 km of low-voltage lines
- the installation of 266 workstations transformers
- the completion of 28,125 single-phase and three-phase connections

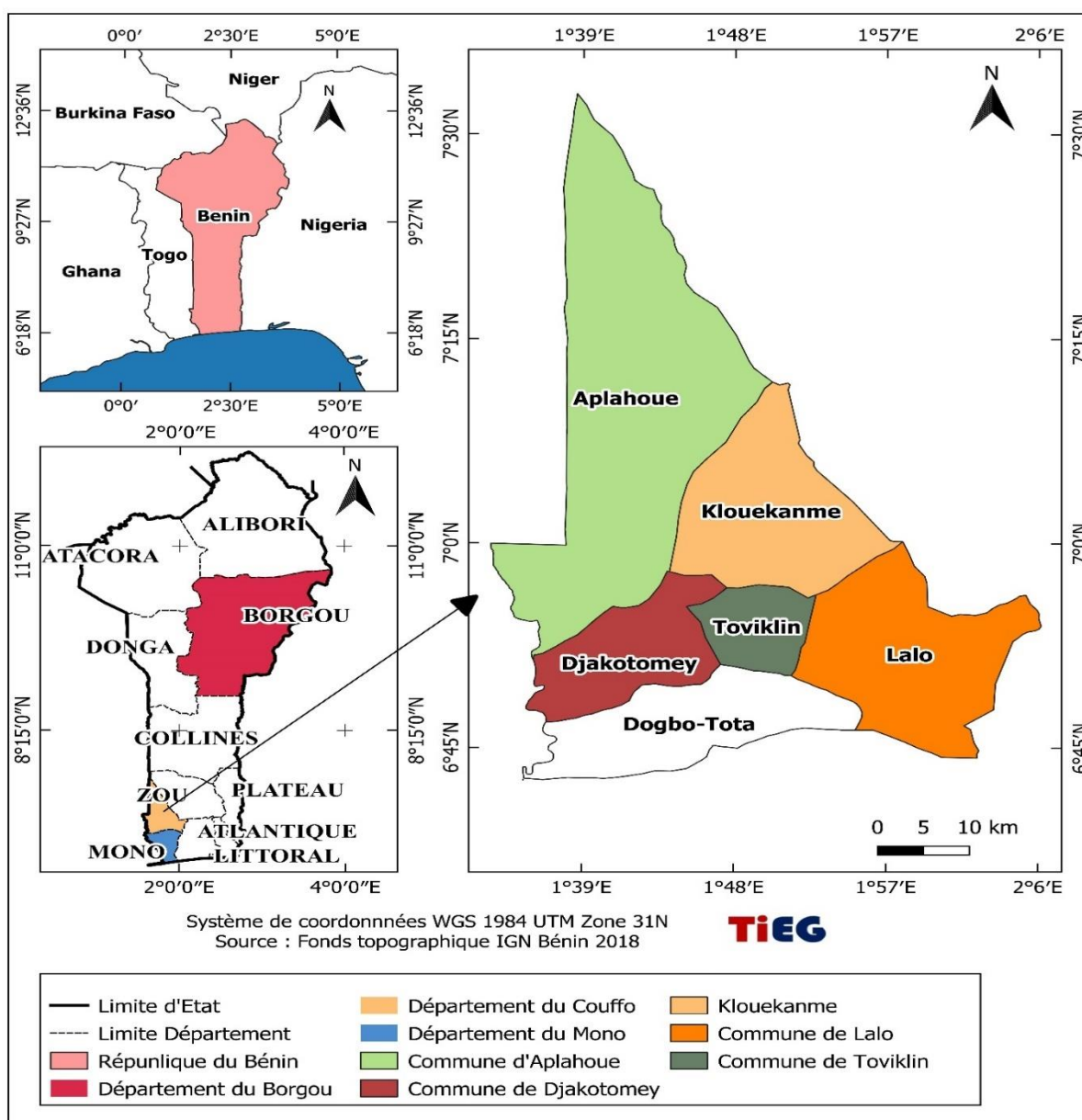


Figure B Map showing the location of the municipalities served by the project (Couffo)

In the Department of Couffo, the PEDER+ project takes into account all six (06) municipalities and covers two hundred and eighty -one (281) localities.

However, this study concerns fifty-six (56) localities in the Communes of Aplahoué, Djakotomey, Klouékanmè, Lalo, and Toviklin. To this end, the planned work in these 56 localities distributed across the aforementioned communes is as follows:

📍 **Municipality of Aplahoué**

- Construction of 10.008 km of overhead medium-voltage (54.6 mm²) power line
- Construction of four (04) 100 KVA transformer substations, twenty-one (21) 160 KVA transformer substations and three (03) 250 KVA transformer substations
- Construction of 114.349 km of low-voltage line (3x50)
- Construction of 55.589 km of low-voltage line (3x70)
- Removal of 27.010 km of low-voltage line

📍 **Djakotomey Municipality**

- Construction of 6.720 km of overhead medium voltage (54.6 mm²) line
- Construction of ten (10) 100 KVA transformer substations and three (03) 160 KVA transformer substations
- Construction of 27.451 km of low-voltage line (3x50)
- Construction of 14.802 km of low-voltage line (3x70)
- Removal of 7.735 km of low-voltage line

📍 **Klouékanmè Municipality**

- Construction of 18.350 km of MV line (54.6 mm²)
- Construction of ten (10) 100 KVA transformer substations and ten (10) 160 KVA transformer substations
- Construction of 47.765 km of low-voltage line (3x50)
- Construction of 32.310 km of low-voltage line (3x70)
- Removal of 9.285 km of low-voltage line

📍 **Lalo Municipality**

- Construction of 1.005 km of overhead medium voltage (54.6 mm²) line
- Construction of seven (07) 100 KVA transformer substations
- Construction of 8.726 km of low-voltage line (3x50)
- Construction of 2.180 km of low-voltage line (3x70)
- Removal of 1,000 km of low-voltage power line

📍 **Toviklin Municipality**

- Construction of 1.240 km of overhead medium voltage (54.6 mm²) line
- Construction of one (01) 100 KVA transformer substation and one (01) 160 KVA transformer substation
- Construction of 4.540 km of low-voltage line (3x50)
- Construction of 2,900 km of low-voltage line (3x70)
- Removal of 3.321 km of low-voltage line

Components of the Project in Borgou

The planned works in the Borgou department include, among other things:

- the construction of 268 km of medium-voltage power lines
- the construction of 858 km of low-voltage lines
- the installation of 137 workstations transformers
- the completion of 18,906 single-phase and three-phase connections

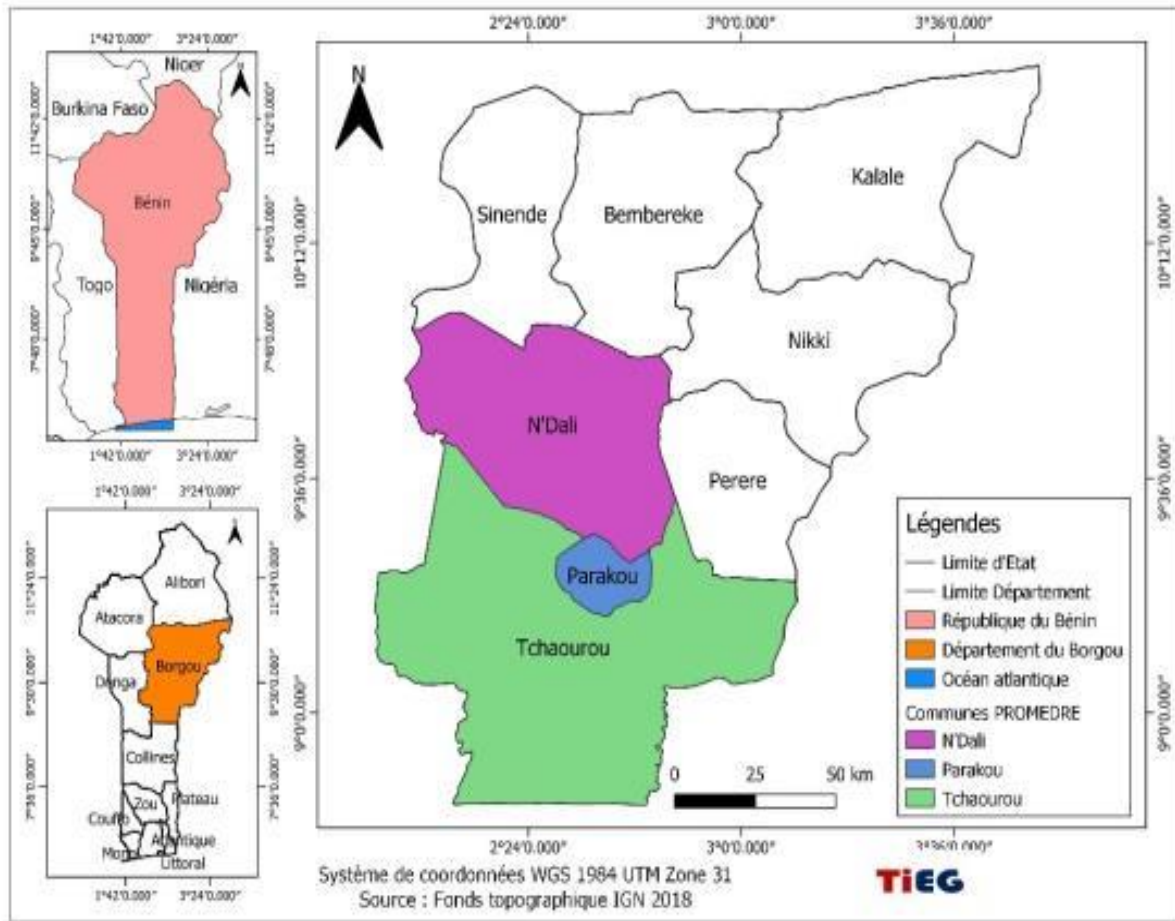


Figure C Map showing the location of the municipalities served by the project (Borgou)

In the Borgou Department , the PEDER+ project takes into account three (03) communes and one hundred and forty-five (145) localities.

However, this study covers 47 localities in the municipalities of Parakou, N'Dali, and Tchaourou. The planned work in these 47 localities, distributed across these municipalities, is as follows:

✂ For the municipality of Parakou

- the construction of approximately 38.617 km of overhead medium-voltage lines;
- the construction of approximately 1.030 km of underground medium-voltage lines;
- the construction of approximately 239.383 km of overhead low-voltage lines;
- the construction of approximately 855 m of underground low-voltage lines;
- the construction of 54 transformer stations (cabin stations and H61 stations).

✂ For the municipality of N'dali

- the construction of approximately 2.285 km of overhead medium-voltage lines;
- the construction of approximately 80 m of underground medium-voltage lines;
- the construction of approximately 55.585 km of overhead low-voltage lines;
- the construction of approximately 150m of underground low-voltage lines;
- the construction of 8 transformer stations (cabin stations and H61 station).

✂ For the municipality of Tchaourou

- the construction of approximately 6,690 km of overhead medium-voltage lines;
- the construction of approximately 16.353 km of overhead low-voltage lines;
- the construction of 3 transformer stations (cabin stations and H61 station).

(ii) Political, legal and institutional framework

National political and legal framework for project implementation

Benin has adopted several strategic policy documents related to environmental protection. Among these policy documents linked to the project are: the National Agenda 21; the National Sustainable Development Strategy (NSDS); the National Environmental Policy (NEP); the Environmental Action Plan (EAP); Benin's policies on climate change; the National Gender Promotion Policy in Benin (NPPG), etc.

The main national texts applicable to the project include, among others:

- ✂ Law No. 90-32 of December 11, 1990 establishing the Constitution of the Republic of Benin as amended and supplemented by Law No. 2019-40 of November 7, 2019;
- ✂ Law No. 98-030 of February 12, 1999, establishing the framework law on the environment in the Republic of Benin;
- ✂ Law No. 98-004 of January 27, 1998, establishing the Labour Code in the Republic of Benin;
- ✂ Law No. 2017-05 of August 29, 2017 establishing the conditions and procedures for hiring, placing workers and terminating employment contracts in the Republic of Benin;
- ✂ Law No. 2011-26 of 09 January 2012 on the prevention and repression of violence against women provides for provisions for the fight against GBV;
- ✂ Law No. 98-019 of March 21, 2003 establishing the Social Security Code in the Republic of Benin;
- ✂ Law No. 2017-15 amending and supplementing Law 2013-01 of August 14, 2013 establishing the Land and State Property Code;
- ✂ Law No. 2002-16 of October 28, 2004 concerning the Wildlife regime in the Republic of Benin;
- ✂ Law No. 2022-04 of February 16, 2022 on public hygiene in the Republic of Benin;
- ✂ Law No. 2010-44 of November 24, 2010 concerning Water Management in the Republic of Benin.

These laws and their implementing decrees are necessary for the implementation of project activities under environmental and social conditions defined by the regulations in force.

Beyond national regulations, the PEDER+ project is implemented under the Environmental and Social Framework (ESF) which allows Technical and Financial Partners and Benin to better manage the environmental and social risks and impacts of projects and to obtain better development results.

According to the World Bank's environmental and social categorization criteria, eight (08) Environmental and Social Standards are relevant to the project, namely: (i) NES No. 1: "Evaluation and Management of Environmental and Social Risks and Impacts"; (ii) NES No. 2: "Employment and Working Conditions"; (iii) NES No. 3: "Responsible Use of Resources and Pollution Prevention and Management"; (iv) NES No. 4: "Health and Safety of Populations"; (v) NES No. 5: "Land Acquisition, Restrictions on Land Use and Involuntary Resettlement"; (vi) NES No. 6: "Conservation of Biodiversity and Sustainable Management of Natural Biological Resources"; (vii) NES No. 8: "Cultural Heritage"; (viii) NES No. 10: "Stakeholder Engagement and Information".

Institutional framework for project implementation

The institutional framework for implementing the sub-project is outlined as follows:

- ◆ **UGP-PEDER+** : the "internal" monitoring of the implementation of the ESMPs during the construction phase will fall under the responsibility of UGP/PEDER+ SBEE and the monitoring mission. Similarly, the Technical Directorate of SBEE will ensure the maintenance of equipment and facilities as well as the implementation of environmental and social measures during the years of operation of the works.
- ◆ **ABE** : The "external" monitoring of the implementation of the ESMPs (or environmental and social inspection) will fall under the purview of the ABE, which will ensure regulatory compliance of the implementation of the measures with regard to the standards in force in Benin.
- ◆ **SIRAT**: it is involved in issuing permits for the occupation of road easements by electrical equipment and installations,
- ◆ **DGHC**: it is involved in the assessment of fixed or mobile buildings/infrastructure affected by project activities.
- ◆ **ANDF**: it is involved in the assessment of private land affected by the project's activities .
- ◆ **Technical services of the municipalities of Comè, Lokossa and Bopa, DDEEM and DDCVT of Mono**: these structures will also participate in the close external monitoring of the works.

- ◆ **Departmental Directorate of Labour and Public Service (DDTFP) Mono:** it will intervene in monitoring working conditions and activities related to workplace safety during work;
- ◆ **National Social Security Fund (CNSS):** Within the framework of this project, any company contracted to carry out the various works must register its employees with the CNSS. The CNSS will then act as the insurance provider for cases of work-related accidents and occupational illnesses, ensuring social security coverage for employees.
- ◆ **Forestry Inspection (FI) Mono:** It will support the sub-project in the implementation of all reforestation and ecosystem protection activities as outlined in the sub-project's environmental and social management plan.
- ◆ **Companies awarded the works :** the implementation of the PGES measures will be ensured by the companies in charge of the works which must recruit into their teams at least one specialist in Hygiene, Health, Safety and Environment and one specialist in charge of social inclusion, gender and GBV issues (certified ISO 45001: 2018 or equivalent) who must be present full time on the construction sites during working hours.
- ◆ **The monitoring team** will ensure the correct implementation of the Environmental and Social Management Plan (ESMP) measures. To this end, it will need to recruit an environmental, health, safety, and social (OHS) specialist (certified ISO 45001:2018 or equivalent) who must be present full-time on the construction sites during working hours. In addition to monitoring the work, the monitoring team will also support the project owner in implementing the Environmental and Social Management Plan (ESMP).
- ◆ **NGO:** A local NGO will be recruited by the Project Management Unit (PMU) to support the implementation of the EAS/HS action plan. This NGO's tasks will include, among others, the prevention of social conflicts and child labor, raising awareness and providing regular training to workers and communities on gender-based violence (GBV), the services available for survivor support, the implementation of the Complaints Management Mechanism, and the management and reporting of GBV-related complaints. The NGO will also be responsible for informing and raising awareness among beneficiary populations and securing the land for the construction/reinforcement of power lines, with the support of the municipalities of Comè , Lokossa, and Bopa .
- ◆ **Key monitoring indicators:**
The main monitoring indicators are: replacement rate of cut trees, number of conflicts between workers recorded and dealt with, number of complaints recorded and dealt with, availability and wearing/use of equipment (PPE and PPE), number of workers wearing protective equipment, number of injury cases recorded, number of accidents recorded by type (indicative, serious, severe), number of accident/incident complaints recorded, number of new cases of STI/HIV-AIDS/COVID 19 reported, number of locals recruited, quantity and type of hazardous waste dumped.

(iii) **Description of the environmental and social baseline situation of the Indirect Influence Zone (IIZ) of the project**

The location of the receiving environment, the description of the biophysical components and the human and socioeconomic characteristics are developed in this section.

☞ **Geographical and administrative situation of the Communes of Mono**

- ☐ **The commune of Comè** is located in the southeast of the Mono Department, approximately sixty kilometers from Cotonou, the economic capital of Benin. It is bordered to the north by the commune of Bopa, to the northwest by the commune of Houéyogbé, to the east by the commune of Kpomassè along Lake Ahémé, to the west by the communes of Grand-Popo and Athiémé, and to the south by the Aho Canal. The commune comprises 33 villages and 5 urban districts distributed across the five sub-districts of Comé, Agatogbo, Akodéha, Ouèdèmè-Xwéla, and Oumako.
- ☐ **The Commune of Bopa** is located in the southeast of the Mono Department. It is bordered to the north by the Communes of Dogbo and Alo, to the south by the Communes of Come and Houeyogbe, to the east by the Couffo River and Lake Ahémé, which it shares with the Communes of Allada and Kpomasse, and to the west by the Communes of Lokossa and Houeyogbe. The Commune of Bopa is roughly quadrilateral, elongated towards the south, and covers an area of 365 km², representing 22.74% of the Mono

Department's total area. It comprises seven (7) districts with sixty (60) localities: Agbodji (7 villages); Badazouin (9 villages); Bopa (13 urban districts); Gbakpodji (6 villages); Lobogo (11 villages); Possotomè (7 villages); and Yègodoé (7 villages).

- ❑ **The Commune of Houéyogbé:** Located in the center of the Mono department, it is bordered to the North by the communes of Lokossa and Bopa, to the South by the communes of Comè and Grand-Popo, to the East by the commune of Bopa, and to the West by the commune of Athiémè. It had a population of 101,893 in 2013. Situated between 6°20' and 6°40' North latitude and 1°45' and 1°57' East longitude, the Commune of Houéyogbé covers an area of 320 km², extending 16.25 km from North to South and 13.75 km from East to West.

- ☞ **The commune of Lokossa**, located between 6°34'34" and 6°46'26" North latitude and 1°34'21" and 1°54'30" East longitude, is situated in southwestern Benin. It is bordered to the north by the commune of Dogbo, to the south by Athiémè and Houéyogbé, to the east by Bopa, and to the west by the Republic of Togo. Lokossa covers an area of 260 km² with a population of 104,428 (INSAE, RGPH4, 2013). It is subdivided into five (5) districts: Lokossa, Agamè, Koudo, Houin, and Ouèdèmè -Adja. Only the central district of Lokossa is considered within the scope of this project.

☞ **Geographical and administrative situation of the municipalities of Couffo**

- **Municipality of Aplahoué** East Located in the Couffo department of the Republic of Benin, it lies between 6°55' and 7°30' North latitude and 1°30' and 1°50' East longitude. It is bordered to the north and northeast by the commune of Djidja, to the south by the commune of Djakotomey, to the east by the communes of Klouékanmè and Abomey, and to the west by the Republic of Togo. It extends over an area of 915 km² (PDC Aplahoué, 2010).
- **Djakotomey Municipality** is located in southeastern Benin. It lies approximately between 6°55' and 6°50' north latitude and between 1°40' and 1°45' east longitude. It is bordered to the north by the communes of Aplahoué and Klouékanmè, to the south by Dogbo, to the east by Toviklin and Klouékanmè, and to the west by the Republic of Togo. It covers an area of 235 km².
- **commune of Klouékanmè**, with an area of 394 km², covers 16.39% of the area of the Couffo Department and 0.35% of the national territory. It is located between 6°50' and 7°00" North latitude and 1°40' and 1°55' East longitude. It is bordered to the north by the communes of Abomey and Agbangnizoun (Zou Department), to the south by the communes of Djakotomey, Toviklin, and Lalo, to the west by the commune of Aplahoué, and to the east by the communes of Agbangnizoun and Lalo.
- **The commune of Lalo** is located between 6°48'20" and 7°01'05" north latitude and 1°50'48" and 2°04'50" east longitude. It is bordered to the north by the communes of Klouékanmè (Couffo) and Agbangnizoun (Zou), to the south by the commune of Bopa (Mono), to the east by the communes of Zogbodome (Zou) and Toffo (Atlantique), and to the west by the communes of Dogbo and Toviklin. With an area of 432 km², it covers approximately 18% of the departmental area and 0.8% of the total area of Benin and is 150 km from Cotonou (PDC Lalo, 2006).
- **Toviklin Municipality** is located between 6° 50' and 6° 56' north latitude and between 1° 45' and 1° 52' east longitude. It is bordered to the north by the commune of Klouékanmè, to the south by the commune of Dogbo, to the east by the commune of Lalo, and to the west by the commune of Djakotomey, and covers an area of 120 km².

☞ **Biophysical characteristics of the communes of Mono.**

► **Climatic characteristics of the project's host territory**

The communes of Bopa, Comè, Houéyogbé, and Lokossa, like the rest of southern Benin, belong to the Guinean or sub-equatorial climate zone. This climate is generally characterized by four seasons, including two rainy seasons alternating with two dry seasons (Egue & Dan, 2018). The average annual rainfall in the Zou department varies between 900 and 1200 mm (INSAE, 2016). The growing season lasts between 80 and 100 days. In Zou, there are two rainy seasons: from March to July and from August to October.

► **Flora and fauna resources of the project's host territory**

The vegetation of the communes of Bopa, Comè, Houéyogbé, and Lokossa is dominated by natural palm groves (*Elaeagnus*) and grasses but includes some patches of classified or sacred forests (INSAE, 2016). The main activity of the population is agriculture combined with logging (primarily charcoal production), which explains the degradation of forest resources and land that needs restoration. The fauna is very diverse, but aside from rare and endemic species in Benin (Sinsin and Assogbadjo, 2002), such as the red-bellied monkey (*Cercopithecus*), there are few other species. *Erythrogaster erythrogaster*, the presence of other mammals, several birds and reptiles, bivalves and fish is noted. Cane rats, antelopes, does, warthogs and red-bellied monkeys are also found there.

Biophysical characteristics of the municipalities of Couffo

► Climatic characteristics of the project's host territory

The communes of Aplahoué, Djakotomey, Klouékanmè, Lalo, and Toviklin enjoy a sub-equatorial climate strongly influenced by the Sudanian-Guinean climate, with a rainy monsoon characterized by two rainy seasons (Adam and Boko, 1993). The climate is primarily defined by rainfall, temperature, sunshine, and wind. The average annual rainfall is 1,188.1 mm (Quenum, 2016). Temperatures are relatively high throughout the year, with monthly averages ranging from 25.76°C in August to 29.94°C in February. The average annual maximum and minimum temperatures are 32.16°C and 23.64°C, respectively. August is the coolest month, with a minimum temperature of 22.62°C. The evolution of average monthly temperatures over the period from 1980-2010 indicates an annual average of 27.85°C (Quenum, 2016).

► Flora and fauna resources of the project's host territory

A variety of plant formations are observed in the Couffo department. These include forests and savannas. Among the forests are gallery forests and semi-deciduous dense forests. Along the Couffo River, gallery forests develop on hydromorphic gley soils and on vertic soils on basic embrechite (Ahokpè et al., cited by Fangnon, 2012). On either side of the river, the forest forms a band. The presence of *Elaeagnus guineensis* and *Lecaniodiscus* is noted. *Cupanoides*, *Angylocalyx oligophyllus*, *Celastrus pentandra*, *Holarrhena floribunda*, *Pterocarpus santalinoides*, *Blighia unijugata*, *Cola gigantea*, *Malacantha alnifolia*, *Cynometra megalophylla*.

As for dense semi-deciduous forests, they are limited to sacred areas. Examples include the sacred forests of Avéganmey in Klouékanmè, Badjamey in Aplahoué, and Lalo. The floristic composition of these formations includes, in the tree layer, species such as *Celtis mildbraedii*, *Triplochiton scleroxylon*, *Albizia zygia*, etc.

Outside of these forests, different types of savannas are distinguished according to the nature of the soil and vegetation cover and the strata of species present.

Lonchocarpus savannae sericeus (Senegal lilac) and *Mitragyna defenseless* find themselves on the waterlogged floors. There are also species such as *Terminalia macroptera*, *Nauclea latifolia*.

Wooded savannas are found on gravelly vertisols. They are home to species such as *Bridelia ferruginea*, *Annona senegalensis*, *Daniella oliveri*, *Andropogon gayanus*, *Cussonia djalensis*.

The different plant formations are of vital importance for reasons of biodiversity conservation, cultural and health function, socioeconomic function and ecological function (Quenum, 2016).

Socioeconomic profile of the likely area of influence of the project (Mono)

► Demographic evolution of the project's host territory

The Communes of Comè, Bopa, Houéyogbé and Lokossa, which constitute the receiving area of the project, have experienced a constantly increasing evolution of their population. As a result, the population of the Commune of Comè increased from 79,989 to 100,216 inhabitants between 2013 and 2023, representing a growth rate of 1.22%; from 96,281 to 120,628 inhabitants between 2013 and 2023 for the Commune of Bopa, with a growth rate of 1.26%; from 101,893 to 127,659 inhabitants for the Commune of Houéyogbé, representing a growth rate of 1.24%; and finally from 104,961 to 131,503 inhabitants between 2013 and 2023 for the Commune of Lokossa, with a growth rate estimated at 1.25%.

► Socio-cultural groups in receiving environments.

The population of the Commune of Lokossa today comprises several sociolinguistic groups, reflecting the great diversity of its inhabitants. Indeed, the majority ethnic groups in the Commune are the Kotafon (70%), who came from Toffo and settled in Lokossa, Djèhadji, and Atikpéta; and those who came from Lon. Agonmè, Avakpa, Togbin and Hougoh settled in Doukonta, Agamè, Koudo and Ouèdèmè -Adja. The group that left Niaouli, Ayou and Sey settled in Adrogbo-Kpota, Ahota and Ouèdèmè -Adja as well as those who came from Ouémé under

threat of wars, the Adja (26%) who came from Tado, having passed through the Aplahoué plateau before settling in Houin, Toguémè, Hlodo, Zoungamey and Adjohoué. To these majority groups must be added the Mina (0.9%), the Fon (0.9%), and others (Aïzo, Bariba, Otammari, Dendi, Yoruba, Sahouè, Watchi, Hwéda, Nagot, Yom, Lokpa, Peulh, Igbo) representing 3.4%. In total, the Commune of Lokossa is a true linguistic melting pot. In terms of religion, all faiths are also represented, but the traditional religion of Vodun is the most widely practiced.

In the commune of Comè, the "Xwéla" ethnic group was the first to settle in the commune and originated from the large group. The socio-linguistic group "Gbé" of Adja Tado. This ethnic group was later reinforced by the arrival of the "Waci" from Togo and Ghana, then the "Sawxè" from Allada. The "Xwéla" are found mainly in the districts of Agatogbo, Akodéha, and Ouèdèmè-Pédah. The "Waci" are strongly present in the districts of Comè and Oumako. As for the "Sawxè," they are distributed much more in the districts of Comè, Akodéha, and Ouèdèmè-Pédah. The three major ethnic groups share the territory of the Commune with other equally significant ethnic groups such as the "Adja," the "Xwla," the "Guens," the "Kotafons," the "Fons," the "Hahoussa," the "Nago," and the "Peulh," making Comè today a cosmopolitan commune, especially at the level of the "central" district (Comè).

The population of the Commune of Bopa today comprises a large number of sociolinguistic groups stemming from its rich and varied history. The majority ethnic groups in the commune are the Sahouè, who migrated from Honhoué, Dakpla, and Doutou in waves during the 18th century to settle throughout the commune's districts; then the Xwéla or Xwéda, who came from Guézin; the Aïzo, who came from Allada; the Kotafon, who came from Agonmè; and the Adja, who are increasingly settling in the commune for commercial activities. To these groups must also be added the Yoruba, Igbo, Dendi, Guen, Goun, Watchi, and Fulani. It is remarkable to note that in their settlements, each group has lost some of its distinctiveness to live in perfect harmony with the other linguistic groups. Furthermore, two types of religion are practiced: traditional religions and foreign religions. Traditional religions are practiced by 54% of the population. These include Hèviosso, Ogou, Toholou, Sakpata, Dan, Djagli, Azon, and Cocou. Their followers are recruited from the general population based on specific motivations. These followers spend one to five years in convents, where they remain in the service of the traditional leaders, except for Cocou, Djagli, and Azon, who undergo an initiation lasting one to two weeks. Followers receive training in various areas, including education (respect for authority, respect for public property, group discipline, etc.) and crafts (basketry, mat weaving, hat making, and basket making). However, this extended stay sometimes hinders access to education and vocational training and prevents active participation in agriculture and other economic activities. Foreign religions include Christianity (30% overall) and Islam (1.3%). They advocate love of one's neighbour and the relationship between the individual and the Supreme Being.

The commune of Houéyogbé is composed of Adja and related groups (94.69%), Fon and related groups (4.44%), Yoruba, Mina, Fulani, Bariba, Dendi, etc. (0.87%). The religious life of the people of Houéyogbé is dominated by Christianity, which is the most prevalent religion, practiced by 48.5% of the commune's population according to the RGPH4-2013 census. This is followed by indigenous religions (Vodun) at 27.2%, while Islam represents only 1%. According to the RGPH4 census, 28.43% of the population is employed in the commune, and 47.3% are engaged in agriculture. 43.98% of households are engaged in farming.

► Economic activities of populations

The main activities of the populations of the communes of Bopa, Comè, Houéyogbé and Lokossa include agriculture, trade and livestock farming.

In the commune of Lokossa, the economy is characterized by a diversity of activities: crop and livestock production, crafts, commerce, transport, industry, services, and to a lesser extent, fishing, hunting, forestry, maintenance/repair, and tourism. The commune's economy is based primarily on agricultural production, dominated by palm groves, maize and cassava cultivation, and market gardening; gravel and sand quarrying; small and medium-sized enterprises in crafts and services; and an embryonic industry represented by textiles; the Houin- Agamè oil mill is no longer operational.

In the Commune of Bopa, agriculture is the main economic activity, employing 66.78% of the active population. It is characterized by impressive arable land potential, particularly the black soils. Other sectors such as crafts and trade, fishing, food processing, and tourism contribute to the commune's economic vitality. The Commune of Bopa has a bustling market in Lobogo, and its economic activity is heavily dependent on this market.

In Comè, besides the central market, which is the main center of trade, there are three (03) secondary markets that have fewer merchants and attract fewer customers. In descending order of importance, these are the markets of Akodéha and Ouèdèmè. Pédah and Oumako. In the commune of Comé, agriculture is primarily subsistence-based. Over 70% of the active population (PDCIII) is engaged in agricultural activities. Agriculture in the commune is characterized by a diversity of crops, dominated by cereals, tubers and roots, legumes, and market garden produce. The farming system is extensive, characterized by relatively low yields, dependent on climatic conditions and due to a lack of modern production techniques (know-how). Generally, the production techniques used are slash-and-burn agriculture, crop rotation, intercropping, and fallow periods. Food crops are mainly maize and cassava, which account for 8,044.23824 tonnes and 18,271.1579 tonnes of production, respectively. Other sectors of activity such as crafts and commerce, fishing, agri-food processing and tourism contribute to the vitality of the economic life of the municipality.

Finally, since the population of Houéyogbé is predominantly rural, its main economic performance is largely dependent on the primary sector. Agriculture remains the activity that employs the majority of the population. Among the main crops is local maize (*Zea*). *Mays* is the most practiced in the commune. It is followed by that of cassava (*Manihot esculenta*), beans (*Phaseolus*) and peanuts (*Arachis*). (*hypogaea*). Conventional livestock farming plays a significant role in departmental production. The commune of Houéyogbé is the second largest producer of sheep after the commune of Bopa, which alone accounts for nearly 54% of departmental production. Goats and poultry are also raised. Fishing takes place in Lake Toho and Lakes Wozo and Dati. The presence of these bodies of water promotes fishing activities in certain districts. The tertiary sector consists solely of markets, which are a major tourist attraction due to their lively atmosphere and the wide variety of goods available for purchase as souvenirs or for consumption. Commercial activities therefore involve the sale of agricultural products and imported goods in these various markets. The commune of Houéyogbé has several markets (Houéyogbé, Sè, Doutou, Dahè, and Honhouè). Handicrafts remain a very marginal activity in the commune. It is limited to the production of a few pottery items, basketry (flowerpots, jars, etc.), and sculptures. One of the commune's economic activities relies on gravel quarrying, the dominant activity in the districts of Sè and Zoungbonou. It should be noted that the food processing industry is almost non-existent in the commune.

► Housing development situation in the municipalities

■ Subdivision situation in the Municipality of Comè

Ten (10) localities are partially subdivided and twenty-six (26) are not subdivided, compared to only eight (08) localities fully subdivided in the commune of Comè.

■ Housing development situation in the Commune of Bopa

All 83 villages and districts of the Commune of Bopa are unplanned.

Currently, no housing developments are fully completed in the Commune. Only the districts of Possotomè, Bopa, and Lobogo have previously undergone housing development projects, which stopped at the site survey stage, with the exception of the Bopa Zone B development, which is in the polygonization phase. It is important to relaunch housing development projects in the Commune in order to redefine development and spatial planning plans.

■ Housing development situation in the Commune of Houéyogbé

In the commune of Houéyogbé, 15 localities are fully subdivided, compared to 8 partially subdivided and 57 not subdivided.

■ Subdivision situation in the Municipality of Lokossa

All the beneficiary localities in the Commune of Lokossa are partially subdivided.

☞ Socioeconomic profile of the likely area of influence of the project (Couffo)

► Demographic evolution of the project's host territory

The municipalities of Aplahoué, Djakotomey, Klouékanmè, Lalo, and Toviklin have experienced population growth over the past four decades. According to the May 2013 census, the population of the Couffo department was 745,328, comprising 348,574 men and 396,754 women, with a sex ratio of 88 men to 100 women. The department covers an area of 2,404 km², resulting in an average population density of 310 inhabitants/km², a

significant increase compared to 218 inhabitants/km² in 2002. This density varies considerably between municipalities, ranging from 278 inhabitants/km² in Lalo to 738 inhabitants/km² in Toviklin.

With the exception of Toviklin, which has 88,611 inhabitants, the other Communes of Couffo concerned by the project exceed the threshold of 100,000 inhabitants: Aplahoué (171,109 inhabitants), Djakotomey (134,028 inhabitants), Klouékanmè (128,597 inhabitants) and Lalo (119,926 inhabitants).

Within the framework of the project to modernize, extend, densify, and strengthen the electricity grid, this demographic dynamic represents a crucial challenge. The extension and reinforcement of the electricity grid aim to address the rapid population growth in these municipalities and improve access to reliable and sustainable electricity.

► **Socio-cultural groups in receiving environments.**

According to the RGPH4 census, the commune of Aplahoué is made up of several socio-cultural groups, which are as follows: Adja: 92.2%; Fon: 5.5%; Yoruba: 0.8%; Dendi: 0.2%; Bariba: 0.1%; Yomlokpa : 0.1%; Fulani: 0.1%; Other: 1.1%. The religions practiced are: traditional: 76.3%; Catholic: 9.7%; Protestant: 0.5%; Muslim: 1.2%; Other: 12.3%.

The population of the commune of Djakotomey is dominated by the Adja socio-cultural group (98.5%), followed by the Fon (0.7%), Yoruba (0.1%) and other (0.6%) groups according to the RGPH 4.

The Commune of Djakotomey is not a cosmopolitan locality, as it is dominated by the Adja ethnic group and related groups, who make up approximately 99.12% of the total population. Other ethnic groups, such as the Fon, Yoruba, and Igbo, represent only 0.9%. The most practiced religions in Djakotomey are indigenous religions (69.8%) and Christianity (23.9%). Muslims represent 0.3% of the population (PDC3 Djakotomey , 2017-2021).

Klouékanmè Commune, the Adja being the largest group at 82.9%. The Fons are the second largest group at 15.8%, followed by the Yoruba at 0.3%, and others representing 0.9%. Religious practices in the Klouékanmè Commune include: traditional religions (76.5%), Catholicism (7.1%), Protestantism (1.4%), Islam (0.8%), and other faiths (14.1%).

In Lalo, animism, practiced by the majority of the population, is complemented by Christianity, Islam, and other faiths. Christianity takes several forms: Catholicism, Celestial Christianity, Pentecost of Faith, Assemblies of God, Apostolic Church, African Revival Church, and Peace of Christ.

The Commune of Toviklin is populated mainly by Adja (97% of the total population); the Fon represent 0.6% and the Yoruba 0.1%; other ethnic groups are poorly represented.

► **Activities economic populations**

The main activities of the populations of the communes of Aplahoué , Djakotomey , Klouékanmè , Lalo and Toviklin include agriculture, livestock farming and trade.

Agriculture is the main economic activity in the Commune of Aplahoué . It employs the majority of the population (over 90% of the working population), from which all segments of society depend. The production system has remained traditional and rudimentary, with some attempts at modernization through animal traction. Agriculture is more prevalent in the northern and central districts, which still have vast tracts of arable land in Atomey , Godohou, and Lonkly. Agriculture is the primary source of employment, far surpassing all other activities. Women play a significant role alongside their husbands. In terms of production, the main crops grown in the Commune include maize, cotton, cassava, cowpeas, tomatoes, and chili peppers. Livestock farming (poultry, pigs, small ruminants, and cattle) is also practiced on a small scale.

The commune of Djakotomey is primarily dedicated to agriculture, processing, and commercial activities. The second major economic activity is the processing of agricultural products. The main processed agricultural products include: cassava processing into gari and tapioca; peanut oil extraction and the production of "

gangondouin " flatbreads; the production of akassa balls and cornmeal porridge, which are sold commercially; soybean oil extraction and soybean meal production; palm oil extraction; and the production of the local alcohol " sodabi ." The third, but equally important, economic activity is livestock farming. This activity is practiced by everyone (men, women, young and old) in all the villages of the commune. It is essentially a complementary activity to agriculture and is not carried out professionally.

Agriculture in the Klouékanmè Commune is subsistence farming, which forms the basis of the economy. Despite the Commune's hydrographic potential, it remains largely rain-fed and therefore dependent on the vagaries of the climate. Livestock farming, fishing, and trade are also economic activities in the commune.

Agriculture, the foundation of the economy in the Commune of Lalo, remains subsistence farming. It is practiced by both men and women of the Commune. Oil palm cultivation is practiced exclusively by men. The techniques used are rudimentary. However, in the Tchi rice-growing area, modern techniques such as power tillers and rice hullers are used. The main crops grown are: maize, cowpeas, cassava, rice, okra, peanuts, shallots, tomatoes, eggplant, chili peppers, oil palm, cotton, wild apples, bananas, oranges, pigeon peas, sweet potatoes, yams, taro, and timber (mahogany, teak, acacia, eucalyptus). This sector includes farmers, fishermen, herders, and hunters. Fishermen, herders, and hunters are in the minority. Fishing is a seasonal activity practiced in the districts crossed by the Couffo River. These are the areas: Zalli, Ahomadégbé, Tohou, Gnizounmè and Tchito. The techniques used are: net, basket trap, hook.

Agriculture is the key sector for economic development in the Commune of Toviklin, according to statistics from CERPA Couffo. Livestock farming is a secondary activity in the Commune. It is practiced traditionally and is mainly characterized by free-ranging animals during the dry season and tethering small and large ruminants during the growing season.

► **Housing development situation in municipalities**

■ **Housing development situation in the municipality of Aplahoué**

In the municipality of Aplahoué, only two (2) localities, representing 8.88%, are fully or partially subdivided, while 91.12% of the municipality's localities remain undeveloped. It is therefore imperative to accelerate subdivision operations, which are essential for providing the municipality with effective development and spatial planning strategies.

■ **Housing development situation in the municipality of Djakotomey**

of the **83** localities in the municipality **are subdivided into building lots.**

■ **Housing development situation in the municipality of Klouékanmè**

None of the 58 localities in the municipality of Klouékanmè are subdivided into building plots.

■ **Housing development situation in the municipality of Lalo**

The housing development has not started in any of the 67 localities of the commune of Lalo, meaning that the 67 localities of Lalo are not subdivided.

■ **Housing development situation in the municipality of Toviklin**

None of the 65 localities in the municipality of Toviklin have been subdivided into building plots. Subdivision projects are essential for Toviklin to provide the municipality with effective land development and spatial planning.

📍 **Geographical and administrative situation of the municipalities of Borgou**

► **The commune of Parakou** is located in the Borgou department of the Republic of Benin. It lies between 6°22' and 6°30' North latitude and 2°15' and 2°22' East longitude. It is bordered to the north by the commune of N'Dali, and to the south, east, and west by the commune of Tchaourou. It covers an area of 445 km², representing approximately 1.72% of the department's area and 0.38% of the national area.

► **The commune of N'Dali** is located in northeastern Benin, in the Borgou department. It lies approximately between 9°45' and 10°15' north latitude and 2°45' and 3°15' east longitude. The commune of N'Dali covers

an area of 3,600 km². It is bordered to the north by the commune of Bembéréké, to the east by the commune of Parakou, to the west by the commune of Sinendé, and to the south by the commune of Tchaourou.

- **The Commune of Tchaourou:** Gateway to the Borgou Department, the commune of Tchaourou is the largest commune in Benin, covering 7,256 km², or approximately 6.5% of the national territory. The commune of Tchaourou is bordered to the north by Parakou, Pèrèrè, and N'Dali. Further east, it shares a border with the Federal Republic of Nigeria, and to the west, it is bordered by the communes of Bassila and Djougou.

📍 **Biophysical characteristics of the communes of Borgou**

► **Climatic characteristics of the project's host territory**

The communes of Parakou, N'dali, and Tchaourou enjoy a Sudanese-Guinean climate. This climate is characterized by two main seasons: a rainy season, from May to October, with average annual rainfall ranging between 1000 and 1200 mm, and a dry season, from November to April, marked by high temperatures and a significant decrease in rainfall. Rainfall is often irregular and concentrated during the rainy period. The region is also influenced by the Harmattan, a dry and dusty wind from the Sahara, which blows mainly during the dry season.

► **Flora and fauna resources of the project's host territory**

The vegetation of the communes of Parakou, N'Dali, and Tchaourou is representative of wooded and shrubby savannas, dominated by species typical of the Sudanian-Guinean zone. The main tree species include the néré (*Parkia biglobosa*), shea (*Vitellaria paradoxa*), the African mahogany (*Khaya senegalensis*). In addition, herbaceous plants and grasses cover the soil during the rainy season. In terms of fauna, species diversity is relatively modest due to human pressure and increasing agricultural activities.

It is home to small antelopes, some primates (including monkeys), reptiles, and a wide variety of birds. However, large wildlife, such as elephants and lions, has virtually disappeared due to deforestation and hunting.

📍 **Socioeconomic profile of the likely area of influence of the project (Borgou)**

► **Demographic evolution of the project's host territory**

The municipalities of Parakou, N'dali, and Tchaourou have experienced significant population growth in recent decades. Indeed, the population of Parakou increased from 103,577 to 255,478 inhabitants between 1992 and 2013, while N'dali grew from 45,334 to 113,604 inhabitants between 1992 and 2013, and Tchaourou from 66,382 to 223,138 inhabitants between 1992 and 2013. This population growth is fueled by a high birth rate and internal migration, primarily driven by economic factors.

► **Socio-cultural groups in receiving environments.**

According to data from the 2013 RGPH4 census, the commune of Parakou is made up of several major socio-cultural groups. The main ethnic groups include the Bariba and related groups (45.7%), the Dendi and related groups (20.4%), followed by the Fulani (16.2%). Other groups, although smaller in number, such as the Fon, Yoruba, and Lokpa, also contribute to the cultural diversity of the commune.

Regarding religious practices, the population of Parakou is predominantly Muslim (54.5%), followed by Christians (30.8%), including Catholics and followers of Protestant churches. Traditional African religions are also present (14.7%), thus fostering peaceful coexistence among these different religious groups.

The commune of N'Dali is made up of several major socio-cultural groups. The main ethnic groups include the Dendi and related groups (41.5%), followed by the Bariba and related groups (26.7%), and the Fulani (15.9%). Other groups, such as the Fon, Yoruba, and Lokpa, although smaller in number, also contribute to the commune's cultural diversity.

Regarding religious practices, the population of N'Dali is predominantly Muslim (52.3%), followed by Christians (29.1%), including Catholics and followers of Protestant churches. Traditional African religions represent approximately 18.6% of the population, thus fostering peaceful coexistence among these different religious groups.

Finally, the Commune of Tchaourou is a melting pot of several socio-cultural groups, mostly settled in clustered housing and highly concentrated in the district capitals, the most important of which are the Bariba and related

groups, the Fulani and the Nagots, followed by the Gwa or Otamari who constitute 21.50%, the Yoruba and related groups 11.60%, the Yoa, Lokpa and related groups estimated at 10.50%, the Fon and related groups 2.30%, the Adja and related groups 1% and the Dendi and related groups 0.6%.

► **Activities economic populations**

The main activities of the populations of the communes of Parakou, N'Dali and Tchaourou include agriculture, trade and livestock farming.

In the commune of Parakou, the dominant economic activity is trade, representing approximately 36.2% of the active population. Traded goods include agricultural foodstuffs as well as imported products. The city is an important transit hub for products from the interior of the country, particularly during the lean season. Lively local markets are regularly held in several neighborhoods, facilitating access to local products.

The commune of N'Dali is also distinguished by its strong agricultural activity, where food crops such as maize, sorghum, and millet are predominant. Producers engage in local and inter-community trade to sell their products, thus contributing to the region's economic dynamism. In addition, livestock farming constitutes another significant source of income for the inhabitants.

Finally, in Tchaourou, the commune's economy is based on three sectors of activity, with the primary, secondary, and tertiary sectors being the dominant. The main agricultural activities are farming, livestock breeding, agroforestry, and forestry. The secondary sector is dominated by small businesses or agricultural processing units. The tertiary sector encompasses trade, particularly informal trade.

► **Housing development situation in municipalities**

■ **Housing development situation in the municipality of Parakou**

Within the municipality, 18 localities are fully subdivided, compared to 22 that are partially subdivided and 2 that are not. It is therefore imperative to accelerate subdivision operations, which are essential for providing the municipality with genuine development and spatial planning strategies.

■ **Housing development situation in the municipality of N'Dali**

Thirty (30) localities are subdivided, five (05) are partially subdivided and twenty-nine (29) are not subdivided in the commune of N'Dali.

■ **Housing development situation in the municipality of Tchaourou**

Of the 90 villages in the municipality of Tchaourou, only sixteen (16) villages and urban districts are currently being subdivided into land parcels, representing approximately 18%, while seventy-four (74) villages and urban districts have not yet undergone any subdivision, representing 82%. Accelerating subdivision operations is essential in Tchaourou to provide the municipality with effective development and spatial planning strategies.

☞ **High voltage lines**

Although medium-voltage power lines are supposed to pass primarily through designated public easements, their presence has irreversible effects on the areas they occupy. Their installation can systematically lead to the relocation of socioeconomic infrastructure or the felling of trees, thus creating spaces that are now inaccessible to the population for activities. Therefore, all Environmentally and Socially Valuable Elements (EVES) likely to be affected are being identified so that a Resettlement and Compensation Action Plan (PARC) can be developed to compensate those affected for the loss of their property.

(iv) Summary of the environmental, social and climate issues related to the project

The identified environmental issues are linked to sensitive elements within the project's area of influence and to the constraints that the project may create during the implementation of the sub-project. Identifying these issues will allow us to understand which environmental components require particular attention. This will enable in-depth discussions with the affected communities to avoid or minimize environmental impacts.

The most significant challenges arising from this project can be classified into three (3) categories: biophysical challenges, socio-economic challenges, and health and safety challenges. The following table presents the main environmental, socio-economic, cultural, safety, and health challenges related to the project's implementation.

Table AE: Summary of environmental and social issues related to the project

Issues identified
Preserving air quality
Soil preservation against erosion and pollution
Protection of plant resources within the corridors of the lines, protection of wildlife and management of greenhouse gas emissions (mainly CO ₂ and NO _x)
Protection of socio-economic assets and crops during the crossing of urban areas and at all sites where facilities are located
Preservation of the health and living environment of populations living near the works and of construction personnel
Preservation of the safety and security of local populations and construction personnel
Protection of sacred and religious sites

Source: Analysis results, January 2025

(v) Analysis of variants and selected variants

Identifying and analyzing these variants requires a careful examination of different alternatives for the construction of MV/ low-voltage power lines, based on a multi-criteria method to evaluate each option. These criteria are based on: **Land situation, Techniques, Environment, Social, Security, Economy and Regulation**

This analysis focuses primarily on the method of installing medium-voltage lines and transformer substations.

► Installation of medium voltage (MV) power lines

The construction of medium-voltage lines presents two (02) variants:

- ✎ **Variant 1a (V1a):** Installation of MV lines on overhead structures using concrete poles.
- ✎ **Variant 1b (V1b):** Installation of underground MV lines (burying electrical cables in the ground, often in trenches equipped with protective sheaths or conduits).

Selected variant: *Following the multi-criteria analysis, variant V1a was selected due to its lower construction and maintenance costs, its adaptability to the terrain, and its easy and quick maintenance.*

► Installation of transformer substations

The construction of MV/low-voltage substations presents three (03) variants

- **Variant 2a (V2a):** MV/low-voltage transformer substation in prefabricated enclosure;
- **Variant 2b (V2b) :** masonry MV/low-voltage transformer substation.
- **Variant 2c (V2c):** MT/BT/H61 transformer station installed on electrical poles in a high position (most often on the upper part of the pole).

Selected variants: *Following the multi-criteria analysis, variants V2b and V2c were selected based on their adaptability to the terrain, their risk and impact on the environment, their lower construction and maintenance costs, and their ease and rapid maintenance .*

In addition, an analysis and optimization choice of sides in the corridor of the HTA lines has been made (see section 6.3.4.) However, in order to prevent the destruction of public property, to avoid excessive tree cutting and to limit negative impacts, local studies of route optimization will be carried out during the execution of the works.

(vi) Project activities

The activities required for the execution of this project are summarized in the following table.

Table AF : Main activities

Activities to complete	Descriptions of the work	Equipment to be mobilized
Preparatory phase		
General site installation	The overall site setup takes into account: <ul style="list-style-type: none"> the various tasks involved in installing and operating the 	The machinery to be mobilized consists of:

Activities to complete	Descriptions of the work	Equipment to be mobilized
	<p>company's site facilities, as well as the requirements for bringing in and storing machinery, assembly equipment, and tools necessary for network construction</p> <ul style="list-style-type: none"> • workforce recruitment • the implementation of a system for monitoring and securing materials and equipment used in the work 	<p>bulldozer, grader, loader, backhoe loader, compactor, shovels, wheelbarrows, machete, etc.</p>
Preparatory work on the land acquisition sites	<p>The preparatory work for the right-of-way mainly involves clearing the space for corridors for lines, substations, poles, access roads, and construction sites. The sub-activities to be carried out are :</p> <ul style="list-style-type: none"> • staking out to mark the locations of the poles and cabins; • felling of trees and shrubs and clearing of undergrowth for the creation of rights-of-way for lines and stations; • the construction of temporary crossings and access routes 	
Work phase		
Construction/extension/densification/rehabilitation and/or construction work	<p>The work concerns:</p> <ul style="list-style-type: none"> • the movement and transport of equipment, materials and supplies • excavations, foundation work, and construction of the substations/cabins • excavation, construction of foundations and installation of poles for overhead lines • the laying of underground and overhead cables • the management and operation of site living quarters • the replacement of damaged poles and pylons • the connections of the MV/low-voltage lines and the execution of commissioning tests for equipment and installations • the demobilization and repatriation of construction equipment and machinery • the development of exploited areas (closure of excavations and diggings, earthworks and scarification of sites, etc.). 	<p>The machinery to be mobilized consists of: tank transporter, crane truck, trucks, concrete mixer, mechanical shovel, mobile crane, shovels, amphibious excavator, tanker truck, light vehicle, etc.</p>
Operational phase		
Commissioning and maintenance of installations and equipment	<p>The activities in this phase concern :</p> <ul style="list-style-type: none"> • the operation of the facilities and the supply of electrical energy; • the preparation and development of a plan for the acquisition of various goods and services for the operation and maintenance of the facilities (oils, new equipment); • the development and implementation of a storage and management plan for oils related to the operation and maintenance of equipment; • the development and implementation of a maintenance and upkeep plan for the facilities and equipment • the development and implementation of a maintenance plan for the land (tree cutting, brush clearing) • the development and implementation of a plan for the storage and management of solid waste (worn or damaged equipment) and liquid waste (contaminated oils); • the development and implementation of a strategy for recovering payments in exchange for the supply of electricity 	<p>The machinery to be mobilized consists of: bulldozer, grader, loader, backhoe loader, compactor, shovels, wheelbarrows, machete, tank transporter, crane truck, trucks, concrete mixer, mechanical shovel, mobile crane, shovels, amphibious excavator, tanker truck, light vehicle, etc.</p>
Dismantling phase		
End of life of electrical installations and equipment	<p>The work covers :</p> <ul style="list-style-type: none"> • the development and implementation of a road traffic plan • excavations for underground cables and excavations at the location of electrical poles 	<p>The machinery to be mobilized consists of: bulldozer, grader, loader, backhoe</p>

Activities to complete	Descriptions of the work	Equipment to be mobilized
	<ul style="list-style-type: none"> • demolitions and excavations of transformer substations • the removal of weapons and connecting cables; • the unbolting and removal of installations (pylons, poles); • handling of electrical equipment and installations; • the development and implementation of a decontamination plan for equipment and areas used for the installation and storage of electrical equipment and installations • the development and implementation of a management plan for solid waste (aggregates, sand spoil) and liquid waste (used oils) • the preparation and development of a management plan for the exploited areas (closure of excavations and diggings, earthworks and scarification of sites, etc.); • the development and implementation of a greening plan for all exploited areas 	loader, compactor, shovels, wheelbarrows, machete, tank transporter, crane truck, trucks, concrete mixer, mechanical shovel, mobile crane, shovels, amphibious excavator, tanker truck, light vehicle, etc.

Source: Fieldwork, TIEG Consortium, December 2024

(vii) Summary of significant potential environmental and social impacts

The potential impacts are summarized as follows:

Table AG : Summary of impacts

Phases	Environments	Potential negative impacts and risks	Potential positive impacts
PREPARATION	Socioeconomic	<ul style="list-style-type: none"> ▪ Traffic disruption ▪ Sound emissions ▪ Loss of socioeconomic assets (43 units) ▪ Heavy pressure on basic social services due to the large influx of workers into the villages 	<ul style="list-style-type: none"> ▪ Creation of temporary jobs ▪ Development of small-scale commercial activities or agricultural products ▪ Promoting local products
	Biophysics	<ul style="list-style-type: none"> ▪ Loss of 2,949 tree feet related to the installation of the base camp and the clearing of the work area (1,181 feet in Comè , 1,519 feet in Bopa , 210 feet in Lokossa and 39 feet in Houéyogbé) ▪ Disturbance of wildlife due to noise emissions from machinery ▪ Soil degradation and disturbance related to material excavation ▪ Soil and groundwater contamination linked to various accidental spills (construction waste, hydrocarbons) ▪ Air contamination linked to emissions of dust particles and exhaust gases during the movement of construction equipment ▪ Construction waste cluttering the environment 	

Phases	Environments	Potential negative impacts and risks	Potential positive impacts
CONSTRUCTION	Socioeconomic	<ul style="list-style-type: none"> ▪ Traffic disruption ▪ Disruption of income-generating activities ▪ Restricting access for residents to homes and socio-community infrastructure ▪ Disturbance of the peace and quiet of the population due to noise pollution from machinery during rest hours ▪ Occurrence of cases of child labour (under 18 years) ▪ Temporary loss of rights of use for residents living near electrical installations to be installed ▪ Occurrence of cases of theft of company and public property ▪ Crop destruction and loss of agricultural income; ▪ Abandonment of waste from the construction work and pollution of the site and its surroundings ▪ Job loss 	<ul style="list-style-type: none"> ▪ Creation of temporary jobs ▪ Circumstantial development of small commercial activities ▪ Business opportunity development ▪ Temporary improvement in income ▪ Technology transfer

Phases	Environments	Potential negative impacts and risks	Potential positive impacts
	Biophysics	<ul style="list-style-type: none"> ▪ Alteration of ambient air quality due to the movement of construction equipment and vehicles ▪ Changes in soil structure and soil erosion caused by excavation work ▪ Soil contamination from accidental hydrocarbon spills and various construction waste ▪ Contamination of surface and groundwater resources by accidental spills of hydrocarbons and various liquid construction waste ▪ Modification of the physical landscape topography by earthworks ▪ Disruption of local or regional climate parameters ▪ Accidental destruction of remains and desecration of sacred or cultural sites during excavation work (construction of structures, borrow areas) ▪ Soil degradation and disturbance related to material excavation ▪ Disruption of local or regional climate parameters ▪ Disruption of the composition of atmospheric constituents ▪ Disruption of volatile organic compound levels ▪ Abandonment of waste disposal from construction work ▪ The Project's footprint will cover approximately 50 % of the Ramsar site and UNESCO biosphere reserve in the Mono Delta. Although neither the integrity nor the conservation objectives of the site are affected , specific management measures will need to be developed to minimize impacts and align with the site's conservation objectives . ▪ Several priority characteristics of terrestrial biodiversity and sensitive tree species (Senegal wood, flour tree, bitter mahogany, iroko, baobab and shea) have been identified on the site 	<ul style="list-style-type: none"> ▪ Soil and vegetation regeneration
EXPLOITATION	Socioeconomic	<ul style="list-style-type: none"> ▪ Disruptions in the supply of electricity due to temporary outages 	<ul style="list-style-type: none"> ▪ Availability and accessibility of electricity ▪ Improvement of safety conditions for people and property ▪ Development of income-generating activities ▪ Improvement of basic socioeconomic services (schools, health centers, markets, etc.) ▪ Improving the living conditions of households

Phases	Environments	Potential negative impacts and risks	Potential positive impacts
	Biophysics	<ul style="list-style-type: none"> ▪ Air contamination ▪ Contamination of surface and groundwater ▪ Noise pollution ▪ Soil contamination ▪ GHG emissions ▪ Loss of biodiversity and risks of collision and electrocution for sensitive bird species 	<ul style="list-style-type: none"> ▪ Regulation of the uncontrolled consumption of land
DISMANTLING	Socioeconomic	<ul style="list-style-type: none"> ▪ Traffic disruption ▪ Restricting residents' access to homes ▪ Job loss 	<ul style="list-style-type: none"> ▪ Creation of temporary jobs ▪ Development of small business activities ▪ Temporary improvement in income
	Biophysics	<ul style="list-style-type: none"> ▪ Air contamination ▪ Changes in soil structure ▪ Soil contamination ▪ Contamination of surface and groundwater ▪ Noise pollution ▪ Changes to the physical landscape 	<ul style="list-style-type: none"> ▪ Remediation of the receiving environment ▪ Regeneration of the vegetation cover ▪ Elimination of greenhouse gas emissions

Source: Fieldwork, TIEG Consortium, December 2024

(viii) Project Risk Summary

Technological, climatic, environmental, and social hazards and/or dangerous situations can arise from:

- ☞ the presence of fuels (petrol, diesel) on the construction site;
- ☞ the fire of a vehicle or machine;
- ☞ the mixing of incompatible products or undifferentiated storage;
- ☞ the presence of sources of flames or sparks (welding, incandescent particles, electrical sparks , short circuits, etc.)
- ☞ working in climatic conditions (wind, sun);
- ☞ the use of construction equipment and machinery
- ☞ presence linked to the influx of labor

Several risks have been identified based on hazardous situations related to project activities. These primarily include the following risks:

- ☞ falls on the same level and inhalation of dust;
- ☞ vehicle skidding ,
- ☞ falls , vehicles overturn;
- ☞ inhalation of fumes or combustion gases;
- ☞ vehicle/equipment collision , pedestrian hit by trucks/equipment;
- ☞ pollution of surface waters and groundwater by wastewater, used oils and pollutants from construction equipment;
- ☞ traffic accidents involving trucks and machinery on the construction site;
- ☞ increase in greenhouse gas emission rates
- ☞ increase in the level of pollution from atmospheric emissions;
- ☞ contact with chemicals;
- ☞ emergence of STI/HIV-AIDS/VTE cases
- ☞ increased vulnerability of sensitive groups following disruption of their livelihoods:
- ☞ conflicts between local population and newcomers
- ☞ conflicts between the company in charge of the work and the local population due to the destruction of property, poor working conditions for the workforce, etc.
- ☞ conflicts between the company in charge of the work and the local population due to non-compliance with customs and traditions
- ☞ load shedding in the supply of electricity
- ☞ Kidnapping / Hostage-taking / Clashes with serious injuries / Fatalities / Attacks / Attacks on construction site facilities and equipment

- ☞ electrocution and electric shock during maintenance activities
- ☞ exploitation and abuse-sexual harassment/gender-based violence (SBA/GBV).
- ☞ emergence of cases of breach of trust linked to the non-payment of debts to populations, especially women and children

(ix) Environmental and social protection measures

Table AH: Summary of measurements mitigation (*avoidance, reduction, mitigation and compensation/enhancement and maximization*)

Phase	Mitigation measures
Preparation	<ul style="list-style-type: none"> ▪ Use vehicles that meet the emission limits for toxic gases and other particulate matter in the Republic of Benin. ▪ Provide workers with appropriate Personal Protective Equipment (PPE) and Collective Protective Equipment (CPE) (masks, helmets, goggles, ear defenders, boots, etc.) and ensure their effective use. ▪ Regularly cover vehicles whose loads are likely to produce dust with tarpaulins. ▪ Water potentially dusty areas periodically, especially school, market, and health center areas. ▪ Use a sound level meter to monitor the noise level of the equipment used. ▪ Comply with the standards set by decree no. 2022-301 of May 25, 2022, regulating noise in the Republic of Benin for construction work in urban areas. ▪ Limit maneuvering/brush clearing operations to the necessary area reserved for the work. ▪ Obtain authorization from the Mono Forestry Inspectorate before felling the base of trees. <ul style="list-style-type: none"> • In consultation with the Mono forestry inspection service, carry out community-based compensatory reforestation, adopting a regulatory spacing and using native and/or exotic species, in public places (schools, health centers, etc.) in: <ul style="list-style-type: none"> - 5,905 plants in Comè - 1,050 plants in Lokossa - 7,595 plants in Bopa . - 195 plants in Houéyogbé ▪ Respect the deadlines for completing the work in order to minimize disturbance to birds and wild animals. <ul style="list-style-type: none"> ▪ Prohibit workers from hunting and transporting game in construction vehicles ▪ Develop and implement a waste management plan ▪ Equip the construction site with drums on impermeable slabs to store used oils and ensure their proper disposal. ▪ Create a watertight platform on all areas where hydrocarbons and their derivatives are handled (station, maintenance service, etc.) ▪ Place absorbent kits in all areas where hydrocarbons and their derivatives are handled (stations, maintenance departments, etc.). ▪ Prioritize manual tree stump removal ▪ Clean construction sites as work progresses and dispose of waste in accordance with legal regulations. ▪ Develop and implement a Stakeholder Engagement Plan for the construction site –PEPP-C) ▪ Develop and implement a Resettlement Action Plan (RAP) in accordance with World Bank NES 5 and the requirements of the AFD and the EU ▪ Allow producers to harvest their current crops before the land is released. ▪ Develop and implement a transparent workforce recruitment plan based on the provisions of the PEDER+ Workforce Management Plan (PGMO). ▪ Comply with the law regarding hiring practices in the wage treatment of workers ▪ Implement the GBV/EAS/HS/ISG/TP action plan ▪ Raising awareness among the population, and especially young people, before the start of work, about available job opportunities and conditions of access; ▪ accessible toilets (for disabled men and women) for staff. ▪ Avoid recruiting workers under the age of 18 for hazardous work ▪ Facilitating the installation of saleswomen around construction site bases ▪ Raising awareness among food vendors about food hygiene rules ▪ Educating, informing and raising awareness among saleswomen about how to behave towards construction workers ▪ Develop and implement a site health and safety management plan (PGSS-C)

Phase	Mitigation measures
	<ul style="list-style-type: none"> ▪ Organize pre-start or safety briefings led by site HSSE representatives ▪ Place first aid kits equipped for initial treatment in case of injury or accident at the site's base camp, in the construction vehicles, and at the various work sites. ▪ Establish a contract with a health center near the construction sites for emergency evacuations. ▪ Install appropriate road signs/speed limits/speed limits and markers ▪ Equip construction equipment with reversing beepers ▪ Obtain the necessary work permits (excavation, load removal or handling, lockout/tagout, height restrictions, etc.) before starting operations. ▪ Regulating the flow of people at construction sites ▪ Install appropriate fire extinguishers at the site base and hydrocarbon tanks. ▪ Display ESSS guidelines on all sensitive construction sites ▪ Create a workers' assembly point ▪ Develop and implement an internal and external traffic plan for construction equipment and vehicles ▪ Position the flag bearers in the construction zones. ▪ Install mobile speed bumps at the schools adjacent to the construction zone. ▪ Raising awareness among staff, users and local residents (young people, women and others) of the construction site on best practices and preventive methods and methods for combating STIs/HIV/AIDS/EVD ▪ Enforcing social distancing measures on the construction site ▪ Prepare and implement an emergency response plan ▪ Develop and implement a Human Resources Management Manual (HRM) ▪ Develop and implement a Social Inclusion and Gender Integration and Human Trafficking Project Plan (PISG-C) ▪ Include a code of conduct in the contracts of all workers, suppliers, and service providers.
Construction	<ul style="list-style-type: none"> ▪ Clean and remove all equipment, machinery and waste from construction sites at the end of the work ▪ Where possible, proceed with the greening of exploited areas. ▪ Regularly monitor the green areas ▪ Conduct an environmental and social acceptance of the works ▪ Limit maneuvering/brush clearing operations to the necessary area reserved for the work. ▪ Remove and store the topsoil in secure locations before any work begins. ▪ To level and smooth all cultivated areas ▪ Spread the salvaged topsoil on the cultivated areas. ▪ Use vehicles that are in good working order and up-to-date with their technical inspections. ▪ Equip the construction site with drums on impermeable slabs to store used oils and ensure their proper disposal. Fuel storage tanks must be located in an impermeable receiving basin capable of holding 110% of the stored fuel volume. ▪ Create a watertight platform on all areas where hydrocarbons and their derivatives are handled (station, maintenance service, etc.) ▪ Place absorbent kits in all areas where hydrocarbons and their derivatives are handled (stations, maintenance departments, etc.). ▪ Use a sound level meter to monitor the noise level of the equipment used. ▪ Respect the deadlines for completing the work in order to minimize disturbance to birds and wild animals. ▪ Prohibit workers from hunting and transporting game in construction vehicles ▪ Develop and implement a Site Health and Safety Management Plan (PGSS-C) ▪ Develop and implement an internal and external traffic plan for construction equipment and vehicles ▪ Raising awareness among vehicle drivers about respecting the Highway Code ▪ Post the signage carriers at schools and other sensitive locations near the works ▪ Use retroreflective markers to indicate any excavations not completed at the end of the day, including any detours. ▪ Install appropriate traffic signs/speed limits and markers. ▪ Prepare and implement an emergency response plan ▪ Employ qualified personnel appropriate for the electrical work. ▪ Stop outdoor work in case of a storm or downpour. ▪ Provide workers with appropriate Personal Protective Equipment (PPE) and Collective

Phase	Mitigation measures
	<p>Protective Equipment (CPE) (masks, helmets, goggles, ear defenders, boots, etc.) and ensure they are worn effectively.</p> <ul style="list-style-type: none"> ▪ Obtain the appropriate work authorization from the monitoring mission before undertaking any type of project execution operation. ▪ Use appropriate techniques to protect the transverse and longitudinal walls of excavations and trenches: sloping, shoring, propping or bracing ▪ Clear away the falling debris from the tops of the excavation trenches and trenches as it is being excavated. ▪ Mark off the excavation area and regulate access for all users. ▪ Maintain the protective devices on the walls of excavations and trenches during backfilling for as long as necessary to ensure personnel safety ▪ Maintain and check equipment periodically before use in accordance with the instructions in the technical data sheets. ▪ Organize training and awareness sessions for staff on risks and safety rules before any operation ▪ Always keep suitable fire extinguishers readily available near the areas where equipment is used. ▪ Install mobile ramps or prefabricated crossing structures for local households and in strategic locations as needed. ▪ Prioritize local labor with equal skills. ▪ Comply with the law regarding hiring practices in the wage treatment of workers ▪ Avoid recruiting workers under the age of 18 for hazardous work ▪ Prioritize local businesses when recruiting subcontractors in cases of equal skills. ▪ Raising awareness among staff, users and local residents (young people, women and others) of the construction site on best practices and preventive methods and methods for combating STIs/HIV/AIDS/EVD ▪ Enforcing social distancing measures on the construction site ▪ Develop and implement a Site Stakeholder Engagement Plan (SSEP-C) ▪ Water potentially dusty areas periodically, especially around schools, markets and health centers. ▪ Develop and implement a transparent workforce recruitment plan based on the provisions of the PEDER+ Workforce Management Plan (PGMO). ▪ Develop and implement a Human Resources Management Manual (HRM) ▪ Develop and implement a Social Inclusion and Gender Integration and Human Trafficking Project Plan (PISG-C) ▪ Implement the GBV/EAS/HS/ISG/TP action plan ▪ Organize training and awareness sessions for staff on risks and safety rules before any operation ▪ Repair or compensate all Stakeholders whose property is accidentally affected ▪ Establish and operationalize a Health and Safety Committee (HSC) and Staff Representatives ▪ Pay wages and any arrears owed to workers and other service providers in strict compliance with the provisions of the labor code in Benin. ▪ No construction activity will be carried out in the core area of the Mono Delta Biosphere Reserve ▪ Clear demarcation of work and storage areas, and appropriate training for workers to avoid any impact on sensitive wildlife ▪ Sensitive tree species may need to be cut down for the Project and, if the impact cannot be avoided, replanting or support for specific conservation programs will be implemented to ensure no net loss of these species. ▪ A specific design minimizing the risks of electrocution and collision for birds will be chosen for poles and lines (insulation, installation of deterrent and flight diversion devices), and the burying of lines located near bodies of water and other sensitive areas will be considered. ▪ An incidental discovery procedure will be established to manage any accidental archaeological discoveries during the construction phase.
Exploitation	<ul style="list-style-type: none"> ▪ Implement a favorable policy for connecting populations to the SBEE network to avoid cobwebs ▪ Raising awareness, informing and exchanging information with stakeholders (national, departmental, municipal authorities, etc.) on the importance of land subdivision operations in the implementation of the policy for providing electricity to the population

Phase	Mitigation measures
	<ul style="list-style-type: none"> ▪ Develop and implement an Environmental, Social, Health and Safety Management System (ESHSMS) ▪ Develop and implement a maintenance and upkeep program for equipment and facilities ▪ Develop and implement a waste management program (liquids, solids and gases) ▪ Develop and implement a maintenance and upkeep program for the land (tree cutting, brush clearing) ▪ Implement a social intermediation (SIM) program to facilitate the connection of populations to the SBEE network ▪ Implement a communication system to inform stakeholders (public, national, departmental, municipal authorities, etc.) about opportunities to subscribe to the SBEE electricity network ▪ Subsidize connection fees (electricity meters) to the electricity grid ▪ Install streetlights in basic socio-community infrastructure ▪ Integrate the maintenance of public streetlights into the maintenance plan for facilities and equipment ▪ Promoting access to electricity for vulnerable groups ▪ Install streetlights on public access roads ▪ Developing and implementing a training or professional development plan for SBEE staff and its subcontractors on electrical risks ▪ Develop and implement a method and operating procedure for intervention on electrical equipment and installations during downpours and thunderstorms. ▪ Develop and implement a communication plan to inform and raise awareness among communities about the risks of electrocution/electrocution related to their work on electrical equipment and installations. ▪ Prioritize local SMEs/SMLs when contracting for the upkeep and maintenance of electrical equipment and installations. ▪ Prioritize the recruitment of skilled local labor for the upkeep and maintenance of electrical equipment and installations. ▪ Establish a complaints management mechanism ▪ Bird mortality monitoring programs will be developed for sensitive lines, and specific compensatory measures will need to be implemented in consultation with the Ramsar site authority and other relevant stakeholders if an impact is observed on these species.
Dismantling	<ul style="list-style-type: none"> ▪ Develop and execute an environmental and social audit ▪ Develop and implement a decontamination plan for equipment and areas used for the installation and storage of electrical equipment and installations. ▪ Develop and implement a program for the management of solid waste (aggregates, sand excavated material) and liquid waste (used oils) ▪ Develop and execute a plan for the management of exploited areas (closure of excavations and diggings, earthworks and scarification of sites, etc.); ▪ Develop and implement a road traffic plan ▪ Develop and implement a staff recruitment and subcontracting plan for activities ▪ Establish and operationalize a Health and Safety Committee (CHS) and Staff Representatives ▪ Pay wages and any arrears owed to workers and other service providers in strict compliance with the provisions of the labor code in Benin. ▪ Develop and implement a Human Resources Management Manual (HRM) ▪ Develop and implement a Social Inclusion and Gender Integration and Human Trafficking Project Plan (PISG-C)
Capacity building	<ul style="list-style-type: none"> ▪ Organizing one (01) training session on PGES monitoring tools for stakeholders in decentralized structures (regional SBEE, DDCVT, Prefectures of the various departments, DDEEM) and technical structures of the municipalities ▪ Organize one (01) training session on PGES monitoring tools for the benefit of actors from central structures (SBEE, UGP PEDER+, MCVT, MEEM, SE MEF) ▪ Organize one (01) information and awareness session on the project and the implementation of the PGES

Source: Fieldwork, TIEG Consortium, December 2024

(x) Risk and Accident Management

❖ Preventive measures

The classification and prioritization of all key factors related to a malfunction prove to be an effective tool for identifying the causes of a situation. This allows them to be used to detect relevant corrective actions. Therefore ,

within the framework of this Environmental and Social Impact Assessment (ESIA), proposals are made for measures to prevent and control risks related to the following areas: hygiene, health and safety at work, and the risks of natural resource depletion.

❖ Preventive measures and emergency systems

The curative measures and emergency systems will be:

- Avoid the risks;
- Assess the risks that cannot be avoided;
- Combating risks at their source;
- Adapting work to the individual.
- Take into account the state of technological development;
- Replace what is dangerous with what is not dangerous or with what is less dangerous.

To achieve this, in light of the identified risk typologies, two (02) main actions are presented:

- Measure 1: An Emergency Plan; for cases of fire and explosion;
- Measure 2: A Medical Emergency Plan; for cases of work-related accidents as well as the management of cases of GBV occurrences.

(xi) Institutional consultations

As part of this study, the institutional consultation was inclusive and participatory in the departments to host the project, involving administrative and local authorities (Departmental Directorate of Living Environment and Transport, SBEE Regional Directorate, Prefecture and Town Hall).

Operationally, four categories of actors were identified, and their participation was ensured through interactive interview techniques, including interview guides.

Following discussions with the various stakeholders, they expressed expectations and grievances recorded in the table below:

Table : Summary of stakeholder expectations and grievances regarding the sub-project

Actors encountered	Municipalities	Stakeholder expectations and grievances
Local authorities	Lokossa	<ul style="list-style-type: none"> • Preserve the mangroves; • Involve the forestry service and the DDCVT in the implementation of activities; • Define forest compensation in relation to the number of trees planted; • To supply all localities involved in the project;
Local authorities	Comè	<ul style="list-style-type: none"> • Involve the local population through public consultations; • Prepare a good report for the EIA; • Collaborate more with the Town Hall, DDCVT, forestry inspection etc... at the time of project implementation; • Conduct a technical feasibility study to determine the best solutions ;
Local authorities	Bopa	<ul style="list-style-type: none"> • Inform the public of the start date of the works; • To effectively begin the work; • Take steps to combat GBV/EAS/HS; • To effectively compensate the PAPs;
Local populations	Bopa	<ul style="list-style-type: none"> • Start work in a short time; • Recruiting labor from among the young people of the village; • Involve local authorities in carrying out the work;
Local populations	Lobogo	<ul style="list-style-type: none"> • Provide workers with a code of conduct; • Recruiting labor from among the young people of the village; • Start the project work; • Take into consideration the streets affected by the project, • Inform the public of the project's completion date
Local populations	Agbodji	<ul style="list-style-type: none"> • to begin work on the project as soon as possible; • Compensate PAPs based on their assets; • List all the assets located within the area;

Actors encountered	Municipalities	Stakeholder expectations and grievances
Local populations	Lokossa	<ul style="list-style-type: none"> • Inventory all assets located within the property boundaries. • Compensate the PAPs; • Recruit young people for work; • Reduce meter costs;
Local populations	Comè	<ul style="list-style-type: none"> • To inform the public about the project; • Identify existing access routes; • To effectively compensate the PAPs; • Implement the complaints management committee; • Promote local employment during project implementation; • Strengthen stakeholder awareness; • Make the demand for meters unlimited;
Local populations	Aplahoué / Dékpo	<ul style="list-style-type: none"> • Proceed with the compensation of all PAPs • Compensate PAPs having their activities or assets within the right-of-way of the lines; • Recruitment of local labor during the implementation of project activities
Local populations	Aplahoué / Azovè	<ul style="list-style-type: none"> • Recruitment of local labor
Local populations	Djakotomey / Bétoumey	<ul style="list-style-type: none"> • To modernize and strengthen the electrical grid in its localities
Local populations	Djakotomey/ Kinkinhoué	<ul style="list-style-type: none"> • Proceed with the compensation of all PAPs • Compensate PAPs having their activities or assets within the right-of-way of the lines; • Recruitment of local labor during the implementation of project activities
Local populations	Lalo/ Zalli	<ul style="list-style-type: none"> • Proceed with the compensation of all PAPs; • List all economic activities along the road for compensation purposes; • Transparency on Protective Measures • Avoid corrupt practices during project implementation
Local populations	Toviklin/ Missinko	<ul style="list-style-type: none"> • Start the work as soon as possible; • Recruit labor from among the village youth and ensure that workers are made aware of GBV and other communicable diseases; • Involve local authorities in taking mitigation, resettlement and compensation measures; • Ensure the replacement of non-functional streetlights in the various locations
Local populations	Toviklin/ Avadjin	<ul style="list-style-type: none"> • Recruit labor from among the village youth and ensure that workers are made aware of gender-based violence and other communicable diseases. • Involve local authorities in mitigating, resettlement, and compensation measures.
Local authorities	Parakou	<ul style="list-style-type: none"> • Genuinely involve local authorities during the project implementation phase; • Take environmental standards into account when carrying out the work; • Take steps to compensate affected individuals who will be within the affected area; • Recruiting labor from among the young people of the village;
Local authorities	Tchaourou	<ul style="list-style-type: none"> • Conduct public consultations in each village • Ensure that local labor is taken into account for the excavation and cutting of impacted plant species; • Provide at least 72 hours' notice before work begins.
Local authorities	N'Dali	<ul style="list-style-type: none"> • Appreciation and hope for the rapid implementation of the project
Local populations	1st Arrondissement of Parakou	<ul style="list-style-type: none"> • Start the work as soon as possible; • Recruiting labor from among the young people of the village; • Involve local authorities in carrying out the work;
Local populations	2nd Arrondissement of Parakou	<ul style="list-style-type: none"> • Start the work as soon as possible; • Recruiting labor from among the young people of the village; • Providing drinking water to the Banikanni-Madjatom and Eni neighborhoods

Actors encountered	Municipalities	Stakeholder expectations and grievances
		<ul style="list-style-type: none"> • Avoid corrupt practices during project implementation
Local populations	3rd Arrondissement of Parakou	<ul style="list-style-type: none"> • Start the work as soon as possible; • Recruit labor from among the village youth and ensure that workers are made aware of GBV and other communicable diseases; • Involve local authorities in taking mitigation, resettlement and compensation measures; • Ensure the replacement of non-functional streetlights in the various locations
Local populations	Tchatchou District	<ul style="list-style-type: none"> • Connecting the towns of Badékarou and Koubou with electricity poles and streetlights • Avoiding red tape in order to get the work done quickly
Local populations	Kika District	<ul style="list-style-type: none"> • Consider the compensation of people affected by the extension of the electricity network on the Kokobe-kpatri section in the Kika district
Local populations	Ouénou District	<ul style="list-style-type: none"> • Start the work as soon as possible; • Recruit labor from among the village youth and ensure that workers are made aware of GBV and other communicable diseases; • Warn the population in time so that they can remove any potential agricultural products that will still be within the project's footprint.

Source : Fieldwork, TIEG Consortium, December 2024

Overall, the authorities present appreciated the project and expressed their desire for its implementation as soon as possible. However, concerns and suggestions were raised regarding the delays in the completion of similar large-scale projects repeatedly announced with great fanfare but never actually implemented.

(xii) Environmental and Social Management Plan (ESMP)

❖ Communication with project stakeholders

Citizen engagement in the targeted villages and neighborhoods is particularly important, in order to unite residents around the project and facilitate problem-solving throughout its duration. It will also foster understanding of the project's objectives, mobilize community support, and create opportunities for dialogue among stakeholders.

For the winning company, throughout the execution of the works, it will have to integrate the expectations of the population and the preservation of the environment and social aspects; the Stakeholder Engagement Plan for the construction site (PEPP-C) will be its guide.

❖ Accident and emergency risk management

Given the nature of the work, the companies responsible for its execution must develop and implement a Site Health and Safety Management Plan (PGSS-C) and an Emergency Response Plan (PIU). Each company will set up on site at a minimum (i) a fully equipped first aid kit, (ii) a small medical clinic with basic medications staffed by a qualified nurse, and (iii) an ambulance to quickly transport victims to the nearest hospital.

❖ Waste management

The method of managing waste (solid and liquid) will be integrated into the operational method of executing the construction site, but also its maintenance during its operation in accordance with the Waste Management Plan and the SBEE policy in this area. However, source reduction measures are being considered to reduce waste production; these include:

- to effectively implement the PGES-C developed at the start of the construction project, including a Waste Management Plan (PGD);
- remove all unnecessary materials deposited from the site and immediately evacuate them to the final storage areas in accordance with the SBEE procedure in this matter;
- proceed to sort the waste produced at the source using the color-coded receptacles;
- consider reusing waste from the work on the construction site;
- collect and transport non-toxic and ordinary waste to authorized disposal sites;
- to provide the site base camp with a sufficient quantity of receptacles for ordinary construction waste.

❖ **Management of worker flows and child labor**

The successful bidder must have an age verification process in place to ensure that no person under the age of 18 or the minimum age required by national legislation is employed.

The same applies to hazardous work. The company must implement a process to ensure that no employee has been recruited to perform hazardous work.

All workers are equal before the law and enjoy the same protection and guarantees. Any discrimination in employment and working conditions based, in particular, on race, color, sex, religion, political opinion, national origin or social origin is prohibited.

Finally, all legal texts relating to workers' rights in general, in particular those defining working conditions and environment, health and safety at work, must be respected in the implementation of this project, in order to optimize the protection of workers.

❖ **Managing gender-based violence**

The following preventive measures to combat gender-based violence may be implemented :

- The development and implementation of a Social Inclusion and Gender Integration Plan and the fight against human trafficking (PISG-C)
- The intensification of awareness-raising actions and denunciation of these degrading acts for both perpetrators and victims;
- Recording and monitoring the management of GBV in the complaints register;
- Improving preventive actions through periodic review of recorded GBV cases and implemented measures

❖ **Managing "incidental discoveries"**

All necessary measures will be taken to preserve archaeological objects in the event of accidental discoveries. To this end, pending the implementation of an accidental discovery management plan, work must be suspended within the protected area until the national body responsible for historical and archaeological sites grants authorization to resume it.

❖ **Capacity building, information and communication**

The capacity building, information and communication plan aims to:

- the Town Halls, the Boroughs and the Prefectures as well as the representatives of the Development Associations of the targeted villages.
- the staff of the PEDER+ Implementation Unit and SBEE
- staff from the company and the monitoring mission

It focuses on:

- training and awareness-raising on health and safety at work;
- support in the context of environmental and social monitoring,
- support within the framework of environmental and social monitoring,
- management of projects and programs;
- the professional accreditation of specialists in environmental and social safeguards (SES) of the SBEE in Environmental and Social Project Management (ESPM).

(xiii) Monitoring and follow-up plan

❖ **Institutional and organizational framework**

The following organization is proposed for the institutional framework for implementing the project's Environmental and Social Management Plan (ESMP):

- Associated project owner : Ministry of Living Environment and Transport in charge of Sustainable Development (MCVT) for the issuance of the Environmental and Social Conformity Certificate (CCES)
- Technical project management : Ministry of Energy , Water and Mines (MEEM);
- Delegated project management : Benin Electricity Company (SBEE);
- Project Management : Environmental Monitoring Office/Mission for project activities, including the implementation of ESSH Material and Human Resources
- Construction company, with implementation of ESSH Material and Human Resources
- Benin Agency for the Environment (ABE) for the environmental and social monitoring of the project;

- Comè Town Hall, the Lokossa Town Hall, the Bopa Town Hall, the Houéyogbé Town Hall and the Mono Prefecture are the beneficiaries of the project in charge of monitoring.

❖ **Monitoring and tracking tools**

Environmental and social monitoring and follow-up must be carried out as follows:

- **Supervision:** it will be ensured by environmental and social safeguard experts from the European Union and the AFD who will carry out support missions during the implementation of the project;
- **Monitoring:** it will be ensured by the Beninese Agency for the Environment (ABE) which will monitor compliance with the national regulations in force regarding the environment;
- **Environmental and social monitoring:** this will be carried out by the Environment and Social Specialists of the PEDER+ Management Unit, the control office/mission with the participation of the town halls, the Boroughs and the prefectures concerned as needed, having within them an HSE specialist.
- **Evaluation/Audit:** An Independent Consultant (IC) will conduct the final evaluation at the end of the work.

(xiv) Complaints handling mechanism

In accordance with the World Bank's NES 5 and the EBRD's Environmental and Social Requirement 10, the grievance mechanism is designed to be simple, robust, and easily usable by affected populations. Its purpose is to collect concerns or complaints from individuals affected by or interested in the project's activities. For this project, the grievance mechanism will operate in accordance with the one established by SBEE.

The contact details for the local branch of the SBEE are as follows:

Société Béninoise d'Energie Electrique – Branche locale Mono

Contact : Madame Diane HOUNTONDJI

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Tel : (+229) 01-94-91-06-05

Société Béninoise d'Energie Electrique – Branche locale Couffo

Contact : Madame Diane HOUNTONDJI

Position : Directrice Régionale

Email : dhountondji@sbee.bj

Tel : (+229) 01-94-91-06-05

Société Béninoise d’Energie Electrique – Branche locale Borgou

Contact : Monsieur Ouorou SOUMAYILA YAKASSOUROU

Position : Directeur Régional

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Tel : (+229) 01-94-01-02-72

(xv) Costs of environmental and social measures

The estimated costs for supervision, monitoring, and oversight of the implementation of the PGES, as well as institutional support and capacity building, are:

- **One hundred eighty-five million six hundred eighty- one thousand nine hundred twenty-two (185,681,922) FCFA** for Mono.
- ***Two hundred ninety-two million one hundred eighty thousand seven hundred thirty-one (292,180,731) FCFA*** for Couffo .
- ***One hundred eighty-seven million eight hundred thirty-two thousand six hundred thirty-seven (187,832,637) FCFA*** for Borgou .

It takes into account the cost of institutional measures, monitoring and oversight of the implementation of the PARC.

Furthermore, the cost of awareness-raising activities, training, environmental and social measures related to the biophysical environment, and site personnel protection are included in the contract with the company responsible for the work. The cost presented is indicative and may vary depending on site conditions.

(xvi) Disclosure of information

In terms of public dissemination of information, in accordance with NES.01 concerning environmental assessment , and within the framework of a strategy of transparency and continuous improvement, this study (or its summary) will be made available to municipalities and prefectures so that the affected populations and local civil society organizations can consult it in an accessible location, in a format and language they understand. Information will also be disseminated to the public through media such as newspapers, the press, and radio broadcasts in national and local languages, targeting all stakeholders.

Following the no-objection notice from both AFD and SBEE, this summary EIA report will be published on their respective websites.