NON-TECHNICAL SUMMARY

INTRODUCTION This

Environmental and Social Impact Assessment (ESIA) relates to the project for the construction and operation of a 65 MW combined cycle thermal power plant in the Industrial Port Zone of Lomé, Togo.

This project named Kékéli (meaning "Aurora" in the Mina language) is consistent with the strategic objectives of the National Development Plan (PND) whose overall objective is "to structurally transform the economy, for strong, sustainable growth , resilient, inclusive, creating decent jobs and leading to the improvement of social well-being". It is the result of the signing of a concession agreement between the Togolese government and the Eranove group on October 23, 2018 for "the design, financing, construction, commissioning, operation and maintenance of the thermal power plant combined cycle with a power of 65 MW". The objective of the Kékéli project is to increase Togo's energy independence and support the country's economic growth, while providing access to quality electricity for as many people as possible. It is designed using the best available technologies, guaranteeing optimal efficiency and reduced impacts.

This ESIA was conducted by the firm JAT Consulting, with the support of international design offices and laboratories, in compliance with Togolese regulations and the standards of international donors in terms of human and environmental protection. environment.

Legal and normative institutional framework

As part of the implementation of the ESIA of this project, the institutional framework mainly concerns the Ministry of the Environment, Sustainable Development and Nature Protection (in particular through the National Agency for Environmental Management : ANGE), the Ministry of Mines and Energy, the Ministry of Health and the Ministry of Finance.

The ESIA was conducted taking into account the Togolese legal framework set by the following texts:

- Law No. 2008-005 of May 30, 2008 on the framework law on the environment which sets the general legal framework for environmental management in Togo and which aims to preserve and sustainably manage the environment;
- Decree No. 2017-040/PR of March 23, 2017 setting the procedure for environmental and social impact studies which specifies the procedure, methodology and content of environmental and social impact studies (ESIA), in application of the article 39 of law no. 2008-005 of May 30, 2008 on the framework law on the environment;
- Decree No. 45-2016 of 1 September 1945 relating to expropriation for public utility which defines the conditions of expropriation for public utility in Togo as well as the payment of compensation to beneficiaries;
- Order 051/ 08/ MMEE/ARSE defining the form, terms and conditions of declaration, request for authorization and granting of authorizations for electricity production, transport and distribution facilities which defines the conditions under which the various authorizations for the installation, production and distribution of electricity are issued.

To these texts are added the various international conventions and agreements ratified by Togo, in relation to the protection of the environment, the electricity sector and health.

Normative framework

This ESIA also refers to the standards of international donors in terms of environmental protection and sustainable development; it is among others:

- the Operational Policy of the West African Development Bank (BOAD)

- the African Development Bank (AfDB) Integrated Safeguards System, the International
- Finance Corporation (IFC) Performance Standards, the General
- Environmental, Health and Safety EHS Guidelines (World Bank Group, April 30, 2007), the EHS for Thermal Power Plants
- (World Bank Group, December 19, 2008).

Project description

The project consists of the construction over a period of 24 months, of a 65MW combined cycle thermal power plant in two phases A and B as well as the fuel supply equipment and the electricity evacuation network:

- Phase A will consist of the installation of the SIEMENS SGT-800 type combustion turbine with an on-site power of 47 MW and the electricity evacuation network.
- Phase B relates to the installation of the 18 MW SIEMENS SST-300 type steam turbine based on on the 47 MW combustion turbine.

The plant will use the following fuels:

- Natural Gas (main fuel) from WAPCO facilities via a 100 m long pipeline; Liquid Propane 95 supplied by SODIGAZ from a
- 400 m pipeline;
- A DDO back-up supply with an on-site storage capacity of 300 m3 .

The energy produced by the plant will be evacuated by an underground High Voltage line to the grid injection point located at the LOME-PORT substation managed by the CEB (Electric Community of Benin), approximately 400 m north of the plant site.

For the development of this project, the Eranove Group relied on the skills of several international equipment manufacturers and suppliers (including the German group SIEMENS and the Spanish company TSK) for technology and project management. This alliance of skills allowed the project to benefit from best practices in terms of efficiency and emission reduction:

- **Combined cycle :** the combined cycle thermal power plant, generally called CCGT (for Combined Cycle Gas Turbine), or TGV (Gas-Steam Turbine), combines two types of turbines: the combustion turbine and the steam turbine. The principle of the combined cycle is as follows: the filtered ambient air is compressed in the compressor of the gas turbine; the compressed air circulates around the combustion chamber before entering the burners where it will mix with the fuel that will be burned later; the flue gas from the gas turbine exhaust will be led directly to the boiler to recover the heat from the exhaust which is used to generate steam.

  Combined cycle operation, by creating energy from the steam produced by the Gas Turbine, makes it possible to significantly increase the efficiency of the plant and reduce the greenhouse gases produced by 30% compared to to an open cycle (i.e. a saving of approximately 100,000 t CO2e/year).

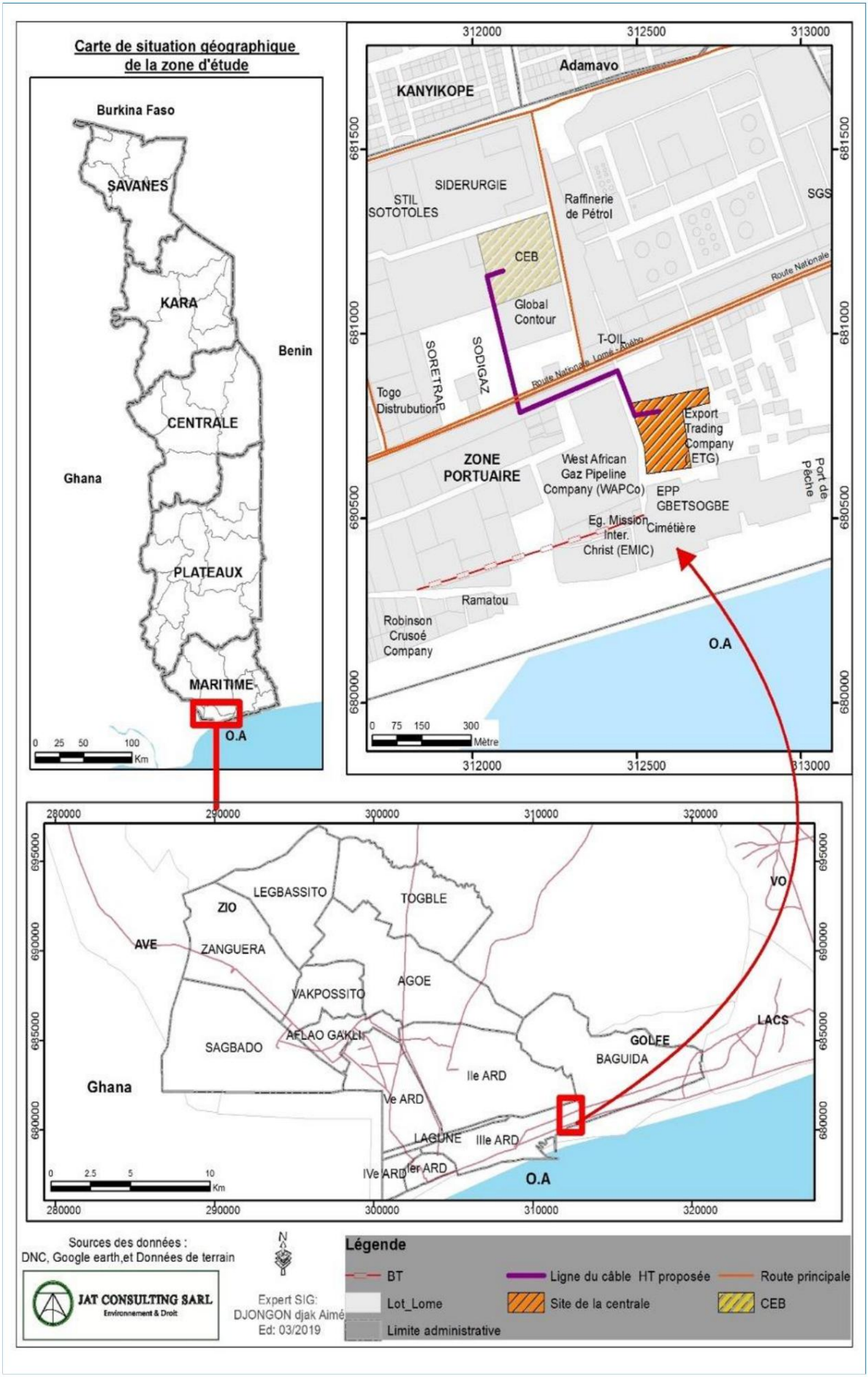
- **3rd generation low emission burners :** The Kekeli project combustor is equipped with 30 3rd generation burners of DLE (Dry Low Emission) design developed in-house. This technology, as applied to the SGT 800, has NOx emission capabilities of 25 ppm (15% O2) with natural gas, 42 ppm with Propane and 75 ppm (15% O2) with DDO liquid fuel without the need to inject water or steam, which considerably limits water consumption (250 tons of water usually consumed daily for NOx reduction with that power).

Exhaust gas samples will be extracted from the stack of the recovery boiler, then conditioned and then analyzed in a measuring cabinet. These devices make it possible to continuously monitor the concentrations of O2, NOx, CO, SOx.

- **A complete acoustic treatment,** adapted to the context of the port area: given its environment (presence of residential receivers and schools nearby, in an area classified as industrial), noise management was integrated from the design of the project. The plant will be equipped with equipment to comply with IFC/World Bank Group limits: internal acoustic screens and at the site boundary, silencer, extension of the height of the chimney, noise reducer, distance from the air condenser and of the TAV (Steam Turbine) of the residential receivers present in the industrial zone.

Site location

With a total area of 3 ha 14a 33 ca, the site of the thermal power plant is located in the port industrial zone of Lomé and near the village of Gbétsogbé.
It is bordered to the north by the site of SIAE, a motorcycle assembly unit, to the south by a road dividing the public primary school and the first houses of Gbétsogbé, to the east by the installations of the sesame processing (ETG) and to the west by an unnamed street serving as access and separating the site from the gas supplier WAPCO. The map below locates the project in its environment.



Presentation of the project promoters

The project is initiated by the company **KEKELI EFFICIENT POWER,** a public limited company under Togolese law which responds to the address 06 BP 62210 Lomé. Its two shareholders are the ERANOVE group (75% of the shares) and the sovereign wealth fund of Togo, TOGO INVEST CORPORATION (25% of the shares).

ERANOVE is a leading pan-African group in the management of public services and the production of electricity and drinking water in Africa.
With more than 9,000 employees, ERANOVE provides essential services through its subsidiaries:

- in the electricity sector, with expertise in production, transmission and distribution electricity: 1247 MW of installed capacity; 2.2 million customers.
- in the water sector, with expertise in the production and distribution of drinking water: 455 million m3 of drinking water produced; 1.9 million customers supplied with drinking water and 535,000 with sanitation.

The Group is committed through its subsidiaries to the QSE (Quality Safety at Work and Environment) and CSR (Corporate Social Responsibility) approach.

TOGO INVEST CORPORATION is a State company created by decree of November 14, 2012, whose mission is to lead the development and implementation of strategic investments by and for the State in order to create value for the economy. Togolese and its populations.

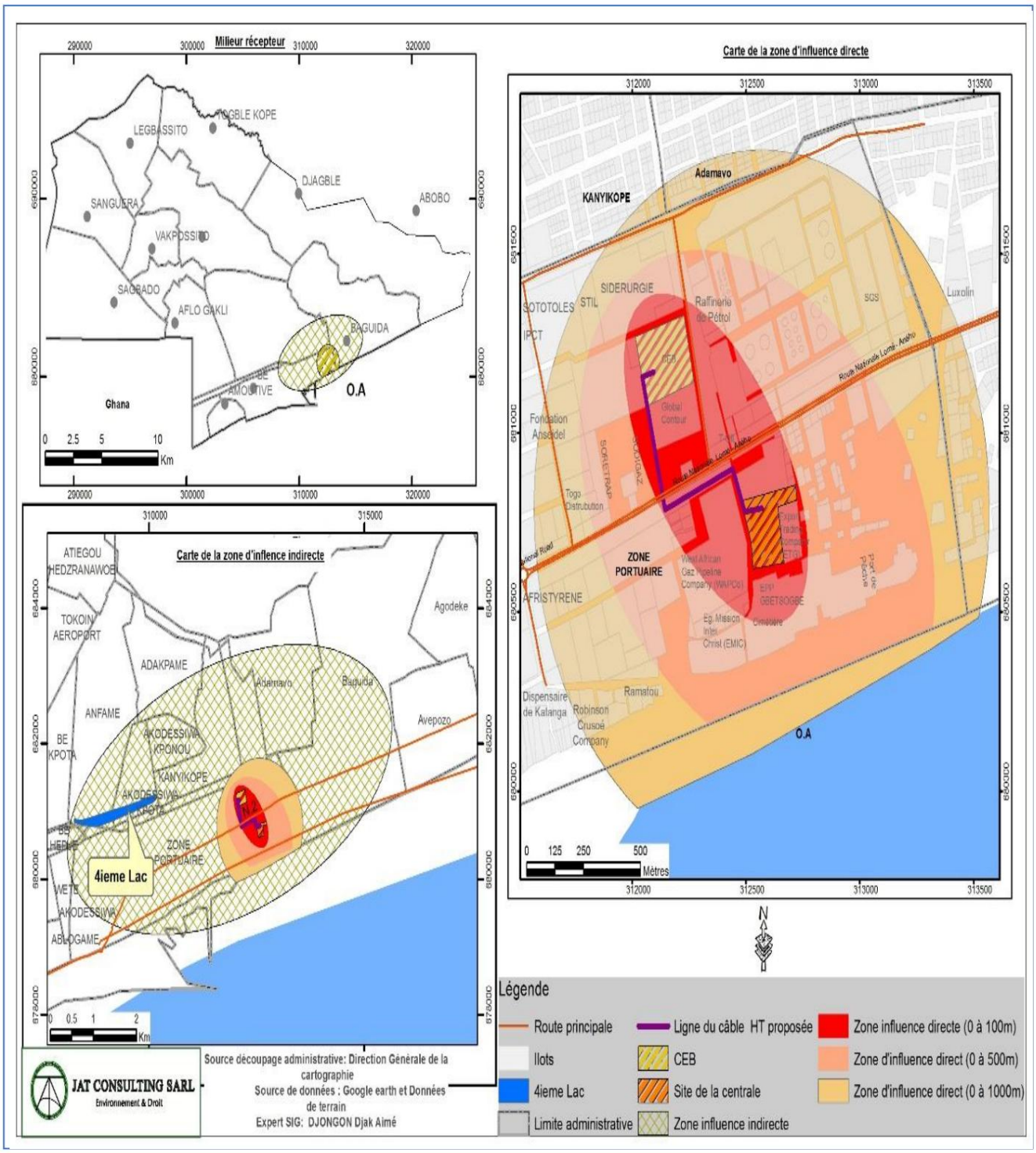
CHARACTERIZATION OF THE INITIAL STATE OF THE PROJECT

Project area of influence

The project's area of influence includes the direct and indirect area of influence.

- The area of direct influence is delimited in consideration of the radius in which the direct impacts of the project will be felt. It was defined in relation to the perimeter or the radius of manifestation of the direct and cumulative impacts of the project and it includes the site, the access road, the right-of-way of the HT line and the underground networks of supply pipelines. Beyond this area where project activities are carried out, the immediate neighborhood is included, covering a radius of 500 m to 1 km around the site.
- The area of indirect influence is delimited in consideration of the infrastructures, the elements of the environment which can feel at a given moment, in a punctual or continuous and more or less severe way, the indirect impacts and risks inherent in the activities of the different phases of the project. It is defined in relation to manifestations of indirect effects with a wider spatial scope. The cumulative impacts of industries in the port area on traffic and air pollution are also considered. The spatial scope of these effects, taking into account the configuration of the zone, can be estimated within a radius of 2 to 10 km.

Figure 1: Map of project areas of influence



Source: JAT Consulting/ CSI 2019

Characteristics of the physical environment

The main characteristics of the initial state of the physical environment have been studied with regard to the available biography, and supplemented by surveys and analyses.

Context of the physical environment : The geology of the project area corresponds to that of the coastal sedimentary basin of Precambrian to Eburnean age. The main formations encountered are Maastrichtian (Upper Cretaceous), Paleocene, Ypresian (Lower Eocene), Lutetian (Middle Eocene), Continental Terminal and Quaternary formations.

The Zio basin located to the north of the project area is watered by the Zio river, with a bimodal rainfall regime (two dry seasons and two rainy seasons) Lomé has an average annual rainfall of 1,140 mm and an average annual temperature of between 28 to 29°C.
The aquifers of the area are distinguished by the aquifer of the sands of the coastal strip and that of the coastal sedimentary basin. The levels measured in the wells indicate that the groundwater for the superficial aquifer is at an average depth of 5 m.

Geo-climatic context: the project site is located in an area of high coastal erosion classified as “very high vulnerability” according to the National Action Plan for the Management of Marine and Coastal Resources in Togo. In this context, Togo has undertaken work to curb the development of coastal erosion, particularly within the framework of projects for the protection of the Togo coastline and the rehabilitation of the Lomé Cotonou road. Based on the studies available on the context and the projects, the average annual retreat of the coastline around the site can then be estimated at a value of less than 4.1m/year.

Air quality : an initial campaign of air quality measurements on the site and in its vicinity was carried out by the company SGS with the aim of determining the concentration levels of pollutants, in particular PM10 particles , CO , SO2, NO2. In consultation with the ANGE, this campaign was supplemented with VOC and CO2 analyses . In the absence of national standards, the WHO directives on air quality have been retained as a reference. All the values recorded are below the thresholds set by this directive.

Water quality : in addition to physical parameters, chemical contaminants such as total oils and greases, heavy metals were investigated. The results obtained are compared, in the absence of national standards, with the WHO quality guidelines for drinking water.
It appears that all the values obtained are below the thresholds and therefore compliant.

Sound levels : the existing noise levels (background noise) were measured by SGS at various points around the perimeter of the study area and the neighborhood over two (2) time slots: the day slot (between 7:00 a.m. and 10:00 p.m.) and the night slot (between 10 p.m. and 7 a.m.). The results were analyzed in the absence of national standards, on the basis of the EHS directives of the IFC and it appears that the level of background noise in the industrial environment is compliant both day and night (<70 dB(A)) while, in the neighboring residential areas, the sound level at certain points exceeds the 45 dB(A) authorized at night and the 55 dB(A) authorized during the day.

Road traffic : traffic records (heavy goods vehicles and light vehicles) carried out in the Aného-Lomé and Lomé-Aného direction on the RN2, an international axis that connects Lomé to Cotonou and Lagos, have been reported.

Soils: samples were taken from two different areas of the plant site. Parameters such as heavy metals and total oils and fats were analyzed. The values obtained are also below the thresholds of the EU Directives1 in the absence of national standards.

[1] *Directives No 86/278 of 12/06/86 relating to the protection of the environment and in particular of the soil, during the use of sewage sludge in agriculture*

Characteristics of the biological environment

The floristic and faunal data of the receiving environment and the coastal zone were analyzed through a documentary review, supplemented by an on-site characterization of the floristic and faunal taxa. The project site is located in an industrial zone characterized by anthropic activities.

Concerning the flora : among the 58 flora species listed on the site, 42 or 72.41% of the entire flora are considered useful (planted deliberately by local residents or spontaneous and used mainly for food purposes). No listed species is assessed according to the IUCN vulnerability criteria. Nationally, only the boabab (Adansonia digitata) is one of Togo's priority food species.

The state of conservation of **the fauna** inventoried on the site is considered to be of minor concern internationally, the species being widely distributed. Indeed, none of them appears on the lists of threatened species according to IUCN or in the annexes of Ordinance No. 4 regulating the protection of wildlife in Togo.

Characteristics of the human environment

The human component of the environmental and social impact study of the Kékéli project focused on the following areas:

- data on the socio-economic environments of the area of direct and indirect influence of the project (divisions and administrative organizations of the districts, socio-economic activities, socio-educational infrastructures, transport infrastructures, population, demography, etc.). - cartographic and graphic data on the administrative division, the populations.

• **Administrative organization**

The site of the thermal power plant and the southern part of the right-of-way of the high-voltage lines are located in the Prefecture of the Gulf, canton of Baguida, village of Gbétsogbé. The parts to the north of the national road of the right-of-way of the high-voltage lines and the propane pipelines 95, for their part, are located in the commune of Lomé (Kangnikopé district).

The two villages bordering the plant are:

- To the south of the plant, the village of Gbétsogbe was founded in 1845 with the arrival of the ancestors of the current village chief named Gbétsogbé. The village of Gbétsogbé which borders the sea has a population estimated today at 9500 inhabitants.
- To the east of the plant, the village of Noudo kopé was created in 1884 by NOUDO LATE LAWSON (father founder) with a population of about 700 inhabitants.

These two villages in the Baguida canton have a heterogeneous population; Indeed, according to the chiefdom, the "Awlan" from Ghana represent the majority ethnic group. The other groups represented in the area are the Ewe and the Mina, not forgetting the populations of neighboring countries (the Hausa, the Zarma) who have settled to carry out commercial activities. It is a young population (average age: 19.6 years), 40% is under 15 years old.
This is due to a high birth rate (34.1‰), but also because of the life expectancy of 64 years on average.

The villages of Gbétsogbé and Noudo Kopé fall under the administrative authority of the Gulf prefecture and the canton of Baguida. The administrative structure of the two villages includes two traditional chiefdoms headed by a village chief each chosen according to the rules of customary designation and a Village Development Committee (CVD) bringing together various technical skills. The CVDs support the traditional chieftaincy in the definition, design and monitoring of the implementation of development projects and activities at the village level: they ensure the development of the village.

The village chiefs in addition to the CVDs work in consultation to regularize the conflicts. The types of conflicts are: quarrels, thefts, complaints and marital problems. Conflict management is done in the presence of the “ASAFOs” depending on the nature of the conflict. The method of land acquisition is generally by inheritance, by purchase, by donation and by family lines according to the districts.

- **Socio-economic activities**

The economic activities of the villages of Gbétsogbé and Noudo Kopé revolve around fishing; While the men fish using purse seines, beach seines, gillnets, lines and canoes, it is the women who sort, wash, dry or smoke the fish.

Fishery products are sold wholesale and generally without ice on landing at the port auction and at other landing sites. The monthly income from fishing is estimated between 80,000 and 300,000 FCFA.
Agriculture is essentially based on farms characterized by the development of market garden plots in public rights-of-way along the national 2 and on private land not yet built. Some areas that receive support from partners such as projects and NGOs are equipped with sometimes modern equipment (efficient motor pumps, irrigation pipes, sprayers).
Industrial development has led to the transfer of available land to promoters, forcing farmers to intensify their production on ever smaller plots. They mainly grow beets, carrots and lettuce, but also onions, cucumbers and spinach.
The market gardening activity is practiced by 90% of men, the monthly income from these farms varies between 100,000 and 800,000 FCFA.
Then come the craft activities (multitude of modestly sized individual activities: mechanical units, sheet metal-welding, masonry carpentry, hairdressing, sewing, braiding, etc.) and trade, dominated by women.

Salaried employment represents 10% of household income sources.
More than half of the households have a means of transport such as a motorbike, the Zémidjan (motorbike taxi) being the main activity of young unemployed graduates.

- **Infrastructure**

The **habitats** encountered in the villages of Gbétsogbé and Noudo Kopé are a mixture of modern (built of concrete blocks with roofs of galvanized sheets and tiles) and traditional (various materials such as hurdles, thatch and sheets). The concessions encountered are sets made up of between 1 and 9 buildings.

The **communication** infrastructures consist of wired and wireless telephone networks equipped with the Internet network.

The villages are served by **Low Voltage power lines,** however only 66% of households use electricity as a source of energy, against 34% who use kerosene. Populations often resort to practices of unsecured makeshift connections called "spiders".

On the **water and sanitation** side ,

- In Gbétsogbé, there are two private boreholes and two wells in the Apkakou district. Since wells are often shallow, the water is exposed to the risk of contamination. In Noudo Kopé, a borehole was built by a company established in the village.
- The villages of Gbétsogbé and Noudo Kopé have no collective sanitation network. The village of Gbétsogbé has two public latrines with four permanent toilets separated by sex.
  The two latrines are no longer functional, that of Noudo Kopé a public latrine. None of these latrines is functional

Regarding **health,** the village of Gbétsogbé has a medical-social center offered in 2011 by the WAPCO project and located on the site of the plant. The center is frequented by the populations of Gbétsogbé, Noudo Kopé and the neighboring districts, especially for deliveries, but also for general consultations, HIV prevention, maternal and child health, prevention and treatment of malaria and early childhood. surgery.
The nursing staff is made up of a nurse housed on the site, two midwives. The building located on the site of the plant is connected to the electricity network but is not air-conditioned. It is not connected to the drinking water network (access to an improved well). The surveys showed that the health center was the preferred practice of 45% of households in terms of care, ahead of self-medication (34%) and traditional medicine (21%).

Finally with regard to **education,** in a context where the national literacy rate among those over 15 was 66.5% in 2018 (78.3% for men and 55.3% for women). The village of Gbétsogbé has two primary schools and a private general education college called la Véracité.

- A public primary school, about 100 m from the southern limit of the plant, made up of two groups and 11 classes in all, with a workforce in 2018-2019 of 470 students. If the school is electrified and equipped with computer tools, there is a lack of didactic equipment. the La Véracité
- private school complex, which includes a kindergarten, a primary school and a middle school, with a total enrollment of 511 students for 2018 – 2019.

ANALYSIS OF VARIANTS

Option without project

It consists in not considering the realization of the project and keeping the status quo. This option will have an impact on the efforts to implement the orientations of the National Development Plan, especially on the aspects related to strategic axes 2 and 3, the realization of which requires the availability of energy and the creation of jobs. While it is obvious that the impacts and risks inherent in the project will be avoided, all the socio-economic, financial and strategic advantages linked to the different phases will be definitively lost.

It therefore appears indisputable that the project option is in all respects the most interesting to recommend in the context of this study.

Variants studied

1. Option 1: Project site
   - Site 1: Lomé port area Site 2:
   - Goumoukopé site 2. Variant
2: Generation technology • Simple cycle
   thermal power plant • Combined cycle
   thermal power plant • Combined cycle
   thermal power plant and renewable energy power plant
3. Variant 3: Route of the high voltage lines for the evacuation of energy •
Route 1: Between the sites of Sodigaz and Contour Global

• Trace 2: CEB route

4. Variant 4: Anti-noise devices Basic options:

• Revision of the layout: relocation to the North of the aero condenser plant and all TAV to keep them away from residential receivers
• Acoustic screen of 20 m in front of the air inlet of the TAG • Noise reduction on the aero condenser
• Acoustic treatment chimney of the recovery boiler (Liner) • Acoustic screen of 5 m around the cooling systems of the TAG • Acoustic screen of. 6 m around the TAG enclosure and the TAG exhaust • Silencer at the inlet/outlet of the TAG ventilation system • Scenario 1: Basic option + recovery chimney silencer + 8m screen to the South. • Scenario 2: Basic option + recovery chimney silencer • Scenario 3: Basic option + TAG exhaust silencer + 8m screen to the South. • Scenario 4: Basic option + recovery chimney silencer + chimney extension to 28m + screens 14m South and 12m North East

• Scenario 5: Basic option + recovery chimney muffler + new 30m chimney + 14m screens South and 12m to the North East

Relevant variants on the project

Based on the analysis of the advantages and disadvantages of the three variants, the following proposals are made for the optimal ones: • For the site, that of the port area is proposed; • For production technology, the combined cycle; • For the route, that passing between the Sodigaz and Contour Global sites. • For the anti-noise devices: scenario 4 (basic options + muffler on recovery chimney + chimney extension to 28m + screens 14m South and 12m to the NE) which respects the limits of the EHS Directives, without effect on deadlines or performance .

In all phases of the design and in consultation with all the parties concerned, the project has been designed in such a way as to minimize its environmental and social impacts.

MAIN IMPACTS OF THE PROJECT

The objective of the environmental and social impact study (ESIA) was to study the impacts that the power plant project would have and to propose avoidance, reduction and compensation measures to be taken in order to minimize the any impacts identified.

Impact identification and assessment methodology

In order to identify the impacts on the environment, the thermal power plant construction project was divided into four phases, namely: development, construction, operation and end of project. Each phase was then broken down into activities. The Leopold matrix made it possible to simulate the interaction between the project's activities and the components of the environment in order to identify the impacts of the former on the latter. An impact can be positive or negative. A positive impact leads to an improvement in the component of the environment affected, while a negative impact contributes to its deterioration. Each negative and positive impact identified was the subject of a

description and an evaluation. The positive impacts are also highlighted in order to ensure their improvement in the project framework.

The methodology used to assess the impacts includes the following parameters: duration, extent, intensity and value of the affected component. The first three parameters are aggregated into a summary indicator to define the absolute importance of the impact. The fourth parameter is added to the absolute importance of the impact to give the relative importance of the impact or its severity. The significance of an impact is therefore a summary indicator, an overall and non-specific judgment of the effect suffered by a given element of the environment as a result of an activity in a given host environment.
The combination between the absolute importance of the impact and the value of the component affected gives the relative importance or the total severity of the impact. In parallel the cumulative impacts of operational and future projects in the area which will affect the residual impacts of the KEKELI project were assessed on weighting criteria and following an expert analysis in order to arrive at the importance of each of the cumulative impacts identified.

Main impacts of the project

The list of negative impacts is summarized in the table below :

SUMMARY OF THE NEGATIVE IMPACTS OF THE PROJECT	
DEVELOPMENT PHASE	*IMPACTS ON THE BIOPHYSICAL ENVIRONMENT*
	Alteration of air quality
	Loss of vegetation and wildlife habitats
	Floor space
	IMPACTS ON THE HUMAN ENVIRONMENT
	Destruction of buildings and crops/
	Displacement and loss of income
	Exposure to respiratory nuisances
	Exposure to noise pollution
CONSTRUCTION STAGE	*IMPACTS ON THE BIOPHYSICAL ENVIRONMENT*
	Alteration of air quality
	Floor space
	Site unsanitary
	IMPACTS ON THE HUMAN ENVIRONMENT
	Exposure to noise pollution
	Exposure to respiratory nuisances
	Traffic disruption
	Social influxes and migration
OPERATIONAL PHASE	*IMPACTS ON THE BIOPHYSICAL ENVIRONMENT*
	Alteration of air quality
	GHG emissions
	Alteration of surface water quality
	Floor space
	IMPACTS ON THE HUMAN ENVIRONMENT
	Exposure to noise and vibration pollution
	Thermal impact
END OF PROJECT PHASE	*ABANDONMENT SCENARIO*
	Abandonment of the plant
	SCENARIO0 DISPOSAL
	Disposal of the plant
	DISMANTLING SCENARIOS
	Dismantling
	Soil contamination
	Site unsanitary
	Noise pollution from workers and neighbors
	Increase in unemployment rate/ job loss

MANAGEMENT PLANS

Environmental and Social Management Plan - ESMP

The Environmental and Social Management Plan (ESMP) described in Chapter 10 takes into account all the identified impacts, the proposed avoidance or mitigation measures as well as the residual impacts (impact after implementation of the proposed measures).

The summary of the ESMP is presented in the following table:

Potential impacts	Sources of impact	Materiality	Mitigation measure/ Enhancement	Residual impact
Alteration of air quality	Plant operation (combustion turbine)	Strong	Design the plant stacks at a sufficient height (21 m) to promote better dilution to the atmosphere of the emission gases in accordance with IFC requirements	Minor
			Ensure the proper functioning and compliance with maintenance instructions for air emissions treatment devices	
			Ensure the proper functioning of the device for continuous measurement of atmospheric emissions at the outlet of the recovery boiler chimney	
			Make external campaign measurements complementary to the internal system, in accordance with the requirements of the environmental permit	
GHG emissions	Plant operation (combustion turbine)	Strong	Finance compensatory reforestation in forest species to reconstitute carbon sinks with the support of the Ministry in charge of the environment by involving, if possible, the population of neighboring villages	Minor
	Emissions from vehicles and construction machinery		Support climate change adaptation projects if possible targeted to the area of influence	
			Ensure good maintenance of the plant in order to allow the continuity of operation of the TAV, energy efficiency tool	
Degradation of water quality	Leakage of engine oil from vehicles and construction machinery	Strong	Put a sealing device on the parking areas of trucks	Minor
			Ensure proper operation of the oil separator	
			Provide liquid hydrocarbon depots with watertight retention basins sized to retain the quantities likely to spill in the event of loss of containment of the tanks	
	Accidental spillage of hazardous products		Educate employees on the management of hazardous products and the action to be taken in the event of an accidental leak or spill	
			Make quarterly analyzes of waste water and ensure their compliance before discharge into public pipes	
	Pipe breakage		Provide a system for the collection, containment, treatment and analysis of fire extinguishing water before discharge into public pipes	
			Design septic tanks in accordance with national regulations	
Destruction of buildings and crops Displacement and loss of income	Clearing and grading of the project construction area	Strong	Implement the RAP according to local requirements and those of international financial partners	Minor
			Put in place a mechanism for monitoring and evaluating the implementation of the RAP	
			Set up a grievance tracking system	

Potential impacts	Sources of impact	Materiality	Mitigation measure/ Enhancement	Residual impact
Damage to cultural and archaeological heritage	Moved project site fetish clearing and leveling of the construction area of the project	Mean	Carry out the usual ceremonies and move the fetish before the start of work Set up a procedure for managing archaeological discoveries during excavations and in case of need for removal, get in touch with the Ministry of Tourism	Minor
Respiratory nuisances	Transport activities on the unpaved access road and on the site	Mean	Carry out, in dry periods, regular watering of the stripped part of the construction site of the power plant and the unpaved access roads Provide workers and all staff with appropriate personal protective equipment and ensure that it is actually worn Cover transport trucks with sand or any other powdery materials, tarpaulin	Minor
	machinery engines and trucks	Strong	Stop the engines of machines and trucks that are not carrying out an operation Make drivers aware of the speed limit on the site Educate workers on the effective wearing of PPE	Minor
Noise	Noise from trucks and construction machinery during construction	Mean	Provide workers and all staff with appropriate personal protective equipment and ensure that it is actually worn Educate truck drivers on the road to avoid excessive honking Install signs prohibiting the use of truck horns at night Use equipment that emits less noise and avoid noisy activities at night	Minor
	building and plant operation	Strong	Carry out acoustic sanitation (silencers, soundproofing walls, acoustic enclosure, etc.) on the noisiest equipment in order to comply with the limits of the EHS directives of the IFC-World Bank at the level of the nearest dwellings; Secure a budget to cover the consequences of noise pollution and complaints. Before the start of construction, launch an additional analysis campaign to extend the ambient noise measurements, particularly in the north-west quarter. Integrate these new results into the simulations to refine them, in particular at the NW of the site in CC. Conduct a field mission to precisely identify the homes potentially affected, set a deadline beyond which no new installation will be taken into account, refine the potential measures and the associated budget. Set up a strengthened complaints management system: • set up a complaints office on the construction site;	Minor

			power plant • *prepare an additional analysis device (noise measurements) in the event of complaints to verify whether the complaint is justified;* • *prepare compensation mechanisms in the event of justified noise pollution;* o *provide a soundproofing wall for the houses to the south-east;* o *provide for temporary relocation arrangements over 12 months (based on rental/ reception cost and additional transport costs in the area);* o *Provide for the cost of building a soundproofing wall for the executive villas in North West) ;* • *In the event of a justified complaint, offer the following compensation :* o *During construction: individual or collective soundproofing work / compensation for temporary move;* o *In operation: collective soundproofing / individual reinstallation.*	
			Ensure technological watch on means of combating noise emissions that can replace the noisiest equipment at an economically acceptable cost	
			Raise awareness and induce staff, service providers and visitors on noise (risks, consequences) and the wearing of PPE	
Social influxes and migration	*Construction activities*	*Mean*	*Contain with the prefectural services and the Sazof the risk of social influx during the construction phase by the following measures:* • *decentralize the recruitment offices away from the construction site in order to avoid crowds of people who could settle there;* • *communicate in a positive and appropriate way in the neighboring villages on the fact that the zone is reserved for industrial activities and that it is not recommended to install new dwellings;* • *organize monthly verification rounds in the area;* • *regularly check with Sazof the development plans for the port area in order to help them communicate on future investments and discourage residential installations.*	*Minor*
			Induce service provider companies to set up their recruitment office far from the site	
			Prohibit service provider companies from on-site recruitment	
			Establish a local employment policy that is clear and transparent, emphasizing the employment of local and local workers with equal skills and informing service providers	
			Prohibit the sale of foodstuffs and other small businesses at the entrance to the site	
Increased economic activities and job creation	*Activities of construction and operation of the power plant*	*Medium (positive impact)*	*Give priority to national or even local companies in order to strengthen economic development.*	*Strong (Positive impact)*
			Set up a capacity building and career plan for locals	
			Support income-generating activities such as the provision of upkeep, maintenance, mechanics, security services,	

Risk Management Plan - RMP

To respond in particular to a specific requirement of the Togolese regulations, this ESIA includes a chapter dedicated to natural, technological environmental risks and occupational health and safety issues associated with the different phases of the project.

The RMP details the measures that will be put in place (with monitoring indicators, managers and associated costs) for each risk area:

- natural risks (floods, rising water table, violent wind, lightning, earthquake) environmental risks (water
- contamination, soil pollution) social and OHS risks (traffic accident, violations of
- morals and customs, STI contamination / HIV, socio-political event, epidemic event, damage to cultural heritage, food poisoning technological risks (related to the propane pipeline, NG pipeline, gas leaks, fire outbreak, fall, related to handling, movement, collapses and falling objects,
- toxic, electrocution and electrification, short circuit, fire, explosion,)

In response to emergency situations, both in the construction and operating phases, Kékéli Efficient Power will ensure the development of the "Reaction Plan to Emergency Situations" or Internal Operation Plan, the measures of which will be regularly tested through implementation exercises.

Budgets, controls and monitoring

Kékéli Efficient Power will establish and update an environmental monitoring program describing the means and mechanisms put in place to ensure compliance with legal and environmental requirements related to the project. The program aims in particular to comply with the laws, regulations and other environmental considerations elaborated in the ESMP. It makes it possible to verify the smooth running of the work, the operation of the equipment and installations and to monitor any disturbance of the environment caused by the construction, operation, closure and dismantling of the project. Environmental monitoring will therefore ensure compliance with: the mitigation or compensation measures proposed in the impact study; conditions set in the government decree; the commitments of the project initiator provided for in the ministerial

- authorizations; requirements of relevant laws and regulations.
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The estimated total cost of the implementation of the ESMP is estimated at 274,491,400 FCFA, that of the implementation of risk prevention measures is estimated at 11,550,000 FCFA.

To these costs will be added that of the control and follow-up to be carried out by the ANGE after the issuance of the environmental compliance certificate.

The control and monitoring to be carried out by the ANGE will include in particular:

- analysis of the quarterly monitoring report produced by the promoter each quarter on the monitoring or implementation of ESMP measures,
- an unannounced or planned inspection by the National Agency for Environmental Management (ANGE). periodic regulatory
- audits carried out every four years throughout the life of the operation.

STAKEHOLDER CONSULTATIONS

As part of this ESIA, meetings were organized with the various stakeholders in order to inform them about the project and the promoter on the one hand and to gather their expectations and respond to their fears and questions on the other.

Subsequently, it proved necessary to organize other meetings with the local populations in order to better ensure the social acceptability of the project; a social support mission was commissioned for this purpose.
These meetings with local residents are listed in the following table:

Date	Frame of the encounter	Meeting place	People met
02/03/2019	*ESIA*	*School of Gbetsogbe*	*Population of the village of Gbetsogbe*
07/03/2019	*ESIA*	*At the head of the village of Gbetsogbe*	*Chieftaincy and representatives of the Village Committees of Development of Gbetsogbe*
10/04/2019	*ESIA*	*At the head of the village of Gbetsogbe*	*Chief of the village of Gbétsogbé and the representatives of the organized groups of the said village*
11/04/2019	*ESIA*	*At the head of the village of Noudokope*	*Chief of the village of Noudokopé*
11/04/2019	*ESIA*	*Court of the Vodou Priestess, guardian of the fetish tree of Gbétsogbé*	*The Priestess, the village chief and his notables*
19/04/2019	*ESIA*	*Public square in the village of Noudokope*	*Population of Noudokopé*
06/27/2019	*Social support*	*Baguida Royal Palace*	*Baguida canton chief, Canton village chiefs, Cantonal Development Committee, Village Development Committees of Villages in the Canton*
06/28/2019	*Social support*	*At the head of the village of Gbetsogbe*	*Population of the village of Gbetsogbe*
08/28/2019	*Social support*	*At the head of the village of Gbetsogbe*	*Population of the village of Gbetsogbe*
09/01/2019	*Social support*	*At the head of the village of Noudokope*	*Population of the village of Noudokopé*

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- Th[illegible]ate of the Persons [illegible]cted by the Project (PAPs) in particular the [illegible]t of [illegible]
- The use of local labor,
- The construction of socio-collective infrastructures,
- The impacts of the project on local residents,
- Support to communities in income-generating activities

Other consultations are planned as part of the social support mission and will make it possible to define action plans and establish a basis for mutually beneficial collaboration with local communities.

Details of the commitments made by the various stakeholders are recorded in the Stakeholder Engagement Plan (PEPP).

Finally, it should be noted that in parallel with this procedure for preparing the ESIA, a Resettlement Action Plan (RAP) was drawn up in a separate document; the objectives of this RAP are (i) to identify the property and people affected by the project, (ii) to assess the compensation costs associated with these losses and (iii) to define the responsibilities, the timetable and the complaints management mechanism as part of the implementation of resettlement actions.