



REPORT

New International Airport of Cabinda (NAIC Project) - Angola

Environmental and Social Impact Assessment - Chapter 17 - Cumulative Impacts

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17.0 CUMULATIVE IMPACTS

17.1 Introduction

This section describes the potential for cumulative effects or impacts (impacts acting in conjunction with each other on a common receptor or resource) associated with the Project and other projects, either ongoing, planned or reasonably foreseeable within or near to it (Project's AoI).

Consideration of cumulative effects is required as part of the IFC policies:

- IFC Performance Standard 1 (PS 1, IFC, 2012) requires the identification of cumulative impacts in the context of the project's area of influence as those *"that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted"*. It is also specified that *"cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities"*, in the related Guidance Note 1 (GN 1).

In addition to the IFC PSs, the IFC Cumulative Impact Assessment and Management - Guidance for the Private Sector in Emerging Markets (August 2013) is also taken into consideration during the assessment. According to the Guideline, the Valued Environmental and Social Components (VECs) are identified as environmental and social attributes that are considered to be important in assessing risks listed below among others:

- Physical features, habitats and wildlife populations;
- Ecosystem services;
- Natural processes (e.g. water and nutrient cycles, microclimate);
- Social conditions (health, economics); and
- Cultural aspects.

While VECs may be directly or indirectly affected by a specific development, they often are also affected by the cumulative effects of several developments. VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways.

17.2 Methodology

Although the environmental and social impact assessment (ESIA) process is essential to assessing and managing the environmental and social impacts of individual projects, it often may be insufficient for identifying and managing incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

One of the key principles of cumulative impact assessment using this approach is to focus on VECs, both for setting context of temporal and spatial boundaries to be considered and in assessing the significance of cumulative impacts.

The assessment is based on consideration of the status of the activities/developments in the vicinity of the Project site and the nature of the information available in order to predict the magnitude of the impact arising from the other activities/developments.

The focus is the condition of the VECs and the scope of the expanded spatial and temporal boundaries for the analysis.

Typically, the baseline data to be collected for a CIA will not be as detailed as that generated during an ESIA, because of the larger area covered and/or changes in the type of data required for the different scale of the assessment. Data that are needed focus on the most important VECs.

The IFC good practice handbook outlines the following six steps to undertaking a Rapid CIA:

- Determine spatial and temporal boundaries;
- Identify VECs in consultation with effected communities and stakeholders;
- Identify all developments affecting VECs;
- Determine present condition of VECs;
- Assess cumulative impacts and evaluate their significance over predicted future conditions; and
- Design and implement (a) adequate strategies, plans, and procedures to manage cumulative impacts, (b) appropriate monitoring indicators, and (c) effective supervision mechanisms.

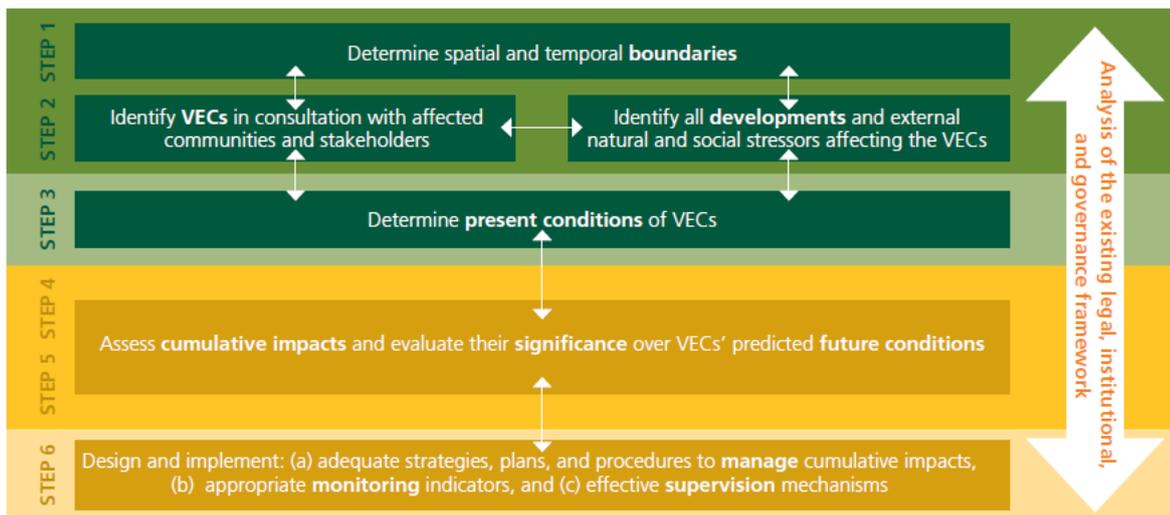


Figure 1: Rapid Cumulative Impact Assessment key steps (source: IFC Good Practice Handbook CIA)

VECs refer to sensitive or valued receptors of combined or cumulative impacts. In this chapter, VECs have been preliminary identified based on:

- site visit and discussion with stakeholders;
- baseline characteristics collected within the ESIA;
- assessments undertaken by each specialist within the ESIA;

The intent of this chapter is to provide a high level assessment of cumulative impacts based on the information available at this stage; it has been undertaken at a high-level in the context of broad development parameters sufficient to provide an understanding of the likely cumulative environmental and social effects. Because of the presence of many projects under development at the same time, a more accurate and detailed assessment will be required once design data and project characteristics are available.

17.2.1 Identification of Valued Environmental and Social Components

In this document, VECs that may be potentially affected by the Project are considered. The VECs have been identified based on the available information obtained for the activities/developments in the vicinity of the Project site and considering the environmental and social conditions of the study area.

The VECs that have been preliminary considered for this Project are identified as follows:

- Physical system (Air quality, Groundwater system, Waste management);
- Use of resources (electricity and water);
- Habitats, wildlife populations;
- Ecosystem services;
- Local communities and livelihoods;
- Local and regional businesses/organisations;
- Workers of the projects.

17.3 Identification of Existing and Future Projects

A search has been undertaken to identify local projects that could have the potential to result in cumulative impacts with the Project, based upon their scale and location. The projects listed in Table 1 have been identified in the close vicinity of the Project site. A short description of each project is provided in the following sections.

Table 1: Existing and Future Projects in the vicinity of NAIC project

N.	Name of the Project	Sector	EIA/ESIA process and status	Location	Distance to the NAIC project
1	Malongo Oil Complex Terminal	Oil & Gas	EIA unknown/under operation	On the E220 road (Futilla – Malembo)	2 Km from NAIC
2	Futilla Power Plant	Energy	EIA unknown/under operation	On the E220 road (Futilla – Malembo)	1 km from NAIC
3	Port of Caio	Transportation	EIA reportedly completed/under construction	Caio bay at 20 Km north of Cabinda city	10 km from NAIC
4	Cabinda Refinery	Oil & Gas	ESIA completed/under construction	On the E220 road (Futilla – Malembo)	1 km from NAIC
5	OHTL from Futilla Power Plant to Buco Zau (Large scale)	Energy	ESIA under development/status unknown	From Futilla Power plant to Buco Zau	To be defined
6	OHTL from Futilla Power Plant to NAIC (small scale)	Energy	EIA unknown/status unknown	From Futilla Power plant to the airport	2,5 km from NAIC (connected to NAIC)
7	E100 road expansion	Transportation	EIA unknown/status unknown	From Cabinda City to the airport	14 km

17.3.1.1 Port Caio

A new deep-water port in Angola known as the Port of Caio is being developed in northern Cabinda Province. The new port will support the economic growth in Cabinda, and was planned as part of a development master plan for the entire province. In its final phase, the port will have a total of 4 large berths with more than 1,250 m of quay walls and dedicated jetties to support the operation of liquid and solid bulk cargos. The port is located 2 km offshore and is reached by a 1,500 m causeway and a 500 m bridge.

The construction has been supported by the Government of Angola, the Ministry of Transport, the Provincial Government, and China's Export-Import Bank.

The port is currently under construction and is expected to come into operation in December 2024¹. It is located about 10 km away from NAIC, as can be seen in Figure 3 below.



Future design of Port Caio - offshore



Port Caio – onshore

Figure 2: Schematic image of the future Port Caio design and aerial photograph of its construction site.

¹ [Jornal de Angola - Notícias - Obras do Porto do Caio em Cabinda ganham maior dinamismo.](#)

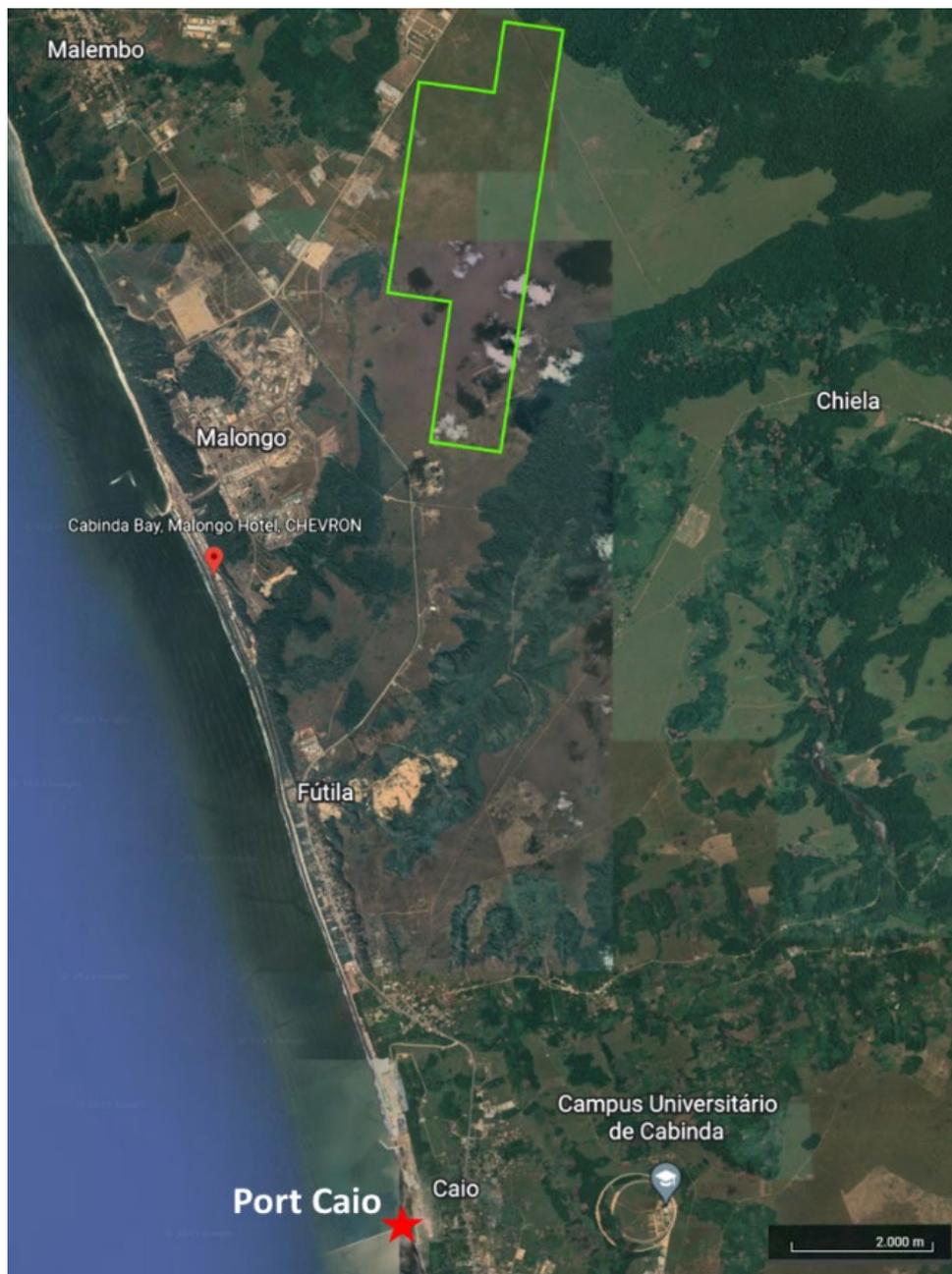


Figure 3: Port Caio location in relation to NAIC's footprint.

17.3.1.2 The Cabinda Refinery

Angola is the second largest producer of crude oil in Africa, after Nigeria. The Cabinda Refinery is being developed on a 313 hectares site and it is located around 1 km distant from the NAIC (Figure 4). It is being built with the objective of expanding Angola's domestic crude oil processing and refining capacity, therefore reducing the country's dependence on imports. The refinery will have an installed capacity to process 60,000 barrels of crude oil per day, once its three implementation phases are completed. Once fully implemented and operational, the Cabinda Refinery will produce gasoline, diesel, oil, fuel, Jet A1 and kerosene. Completion date is expected for 2024². A photo of the refinery construction site taken during the Project site visit is shown in Figure 5 below.

² [Construction of the Cabinda refinery is in the equipment assembly phase - Ver Angola - Daily, the best of Angola.](#)



Figure 4: Cabinda Refinery's location in relation to NAIC's footprint.

The new refinery in Angola will be jointly developed by Sonaref, a subsidiary of Angola's state-owned oil company Sonangol, and Gemcorp Capital, a private investment management company. The same contractor (OEC) that will construct the airport is also currently working at the Refinery with a separate and owned construction camp.

The proximity to the Malongo Oil Complex and the possibility of benefiting from that infrastructure, made the site favorable to the refinery development.



Figure 5: Refinery OEC Construction site (source: WSP Feb 2023).

17.3.1.3 Malongo Oil Complex Terminal

Malongo Oil Complex is the terminal situated 17km N of Cabinda along the coastal road from Futila to Malembo. It is a crude oil and gas terminal, operated by Chevron Cabinda Gulf Oil Company. The oil terminal consists of 2 Berths. Crude oil from the Malongo onshore tank farm is transferred to export vessels via submarine pipelines. Gas is stored in the storage tanker "Berge Troll" then transferred to the export vessel in a ship to ship alongside operation.

17.3.1.4 Futila/Malembo Power Plant

Futila or Malembo Power Station is a gas power plant with a total output of 95MW. It is based on 2 medium-sized combined cycles, with 100 MW each, complemented with a simple-cycle turbine of 40 MW operating as backup. It is currently operated by PRODEL-EP, the Angolan entity which manages electricity in the Country. The plant has two turbines and dual system (diesel and gas), therefore in case of shortage of gas, the plant can also run-on diesel. The plant is supplied with fuel gas from the Malongo oil field and has an average consumption of 80 m³ per hour.

It is located 1 km from the airport border and on the cross with the Sassa Zau road interconnection and will provide energy to the airport when in operation.



Figure 6: Photograph of the power plant (source: WSP)



Figure 7: Malembo/Futila Power plant location

17.3.1.5 Overhead Transmission Line

17.3.1.5.1 Large Scale OTL

It is understood that there are ongoing development programmes in the Province of Cabinda for increasing the electrical power system including the development of additional electrical lines. It is planned an expansion of Futila/Malembo plant switchyard to accommodate new line bays and transformers bays as well as the construction of a new 60 kV electric line from Futila/Malembo power plant to Buco Zau substation of approx. 40 km, however as of today details are not still available.

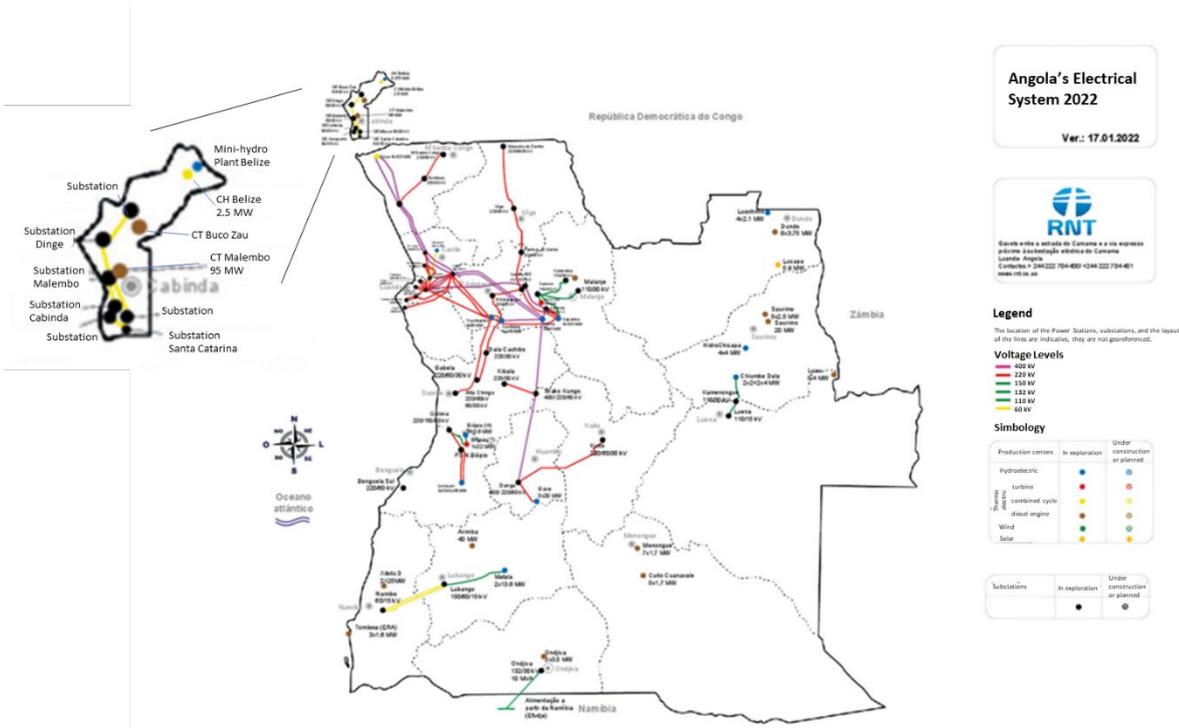


Figure 8: Map of Electricity Transmission lines in Angola, with a focus in the Cabinda Province. (Source: modified from ALER, 2022).

17.3.1.5.2 Small Scale OTL – Associated Facility

As anticipated in the Project description (see Chapter 2) a 2,5 km of transmission line is required for supplying energy to NAIC airport once in operation and based on the IFC PS1 definition this falls under the associated facility classification. From the information available to date, the Ministry of Energy is responsible for the construction and no information are still available about timing and possible selected contractor to undertake such activities. There are options for which it could be OEC (the same contractor working on NAIC and the Refinery of Cabinda), but it is still not confirmed. This OTL although connected to NAIC, will not be funded and consequently will be developed according to the local legislation. The selected area is already crossed by an existing overhead power line and reportedly the intention is to proceed with a parallel routing to the existing one.

From an environmental and social perspective, the 2,5 km OTL are already included in the area of influence and does not require significant analysis in the area. The main risk is related the construction activities, if managed by an unknown contractor, so the list of mitigation measures proposed for the projects as part of the cumulative assessment are valid also in this case.

17.4 Interaction with NAIC Project

Based on the information available it is noted that two of the five listed projects are currently operating, two are currently under construction and three are planned.

The baseline carried out in spring 2023 has already considered the two-operating project (Oil Complex terminal and the power plant), so it is assumed that data collected also included effects of these operation. The cumulative assessment will be concentrated on the two projects under construction (the Refinery and the new Port) which in addition to NAIC may cause situation of stress to the environment.

A summary of the preliminary impacts predicted to result from the proposed Project, in combination with identified foreseeable future projects are presented respectively in the two tables below. Such effects have not to be considered exhaustive as details of all the considered projects are not still available. Conversely these

preliminary cumulative effects will serve to open a discussion with the authorities and the owners of all projects to define measures that can prevent the negative effects as described.

A further and more accurate and detailed CIA should be developed before operation starts focussing predominantly on the aspects raised in Table 3 below.

17.5 Preliminary Cumulative effect during construction and operation

Table 2: Preliminary Cumulative effects – Construction

VEC	Impact	Cumulative Effect
Physical system	Air quality and GHGs Increase of air pollutant emissions and dusts	The construction activities of the Port of Caio, the Cabinda Refinery and NAIC Project at the same time have the potential to deteriorate local air quality, as a consequence of the emissions and the generation of dusts from the construction vehicles activities. Similarly, the surrounding Projects under operation, namely the Malongo Complex Oil Field and the Futila Power Plant contribute to air pollution due to the use of vehicles for the normal operations of the plants. Such data has been considered in the baseline assessments and it is noted that air quality levels already exceed the limits in some points. Given short radius and the same route connection, the are likely to use similar routes, generating traffic and affecting the same receptors.
	Groundwater system: pollution from spillages or leaks	The construction activities associated to the Port of Caio, the Cabinda Refinery and NAIC Project, as well as the projects under operation, have the potential to deteriorate local aquifers following wastewater discharge, spillages or run-offs.
	Waste and wastewater	The Projects under construction as well as the projects currently under operation, are likely to generate considerable amounts of waste. As noted for NAIC Project waste disposal has been assessed as a potential risks because of lack of qualified landfill in Cabinda. Different projects under development in the same area may lead the system to collapse.
Habitats, wildlife populations	Flora and fauna disturbance	The projects under construction and operation are likely to critically impact flora and fauna sensitive receptors. The generation of noise, vibrations and increased artificial lighting and air pollution are found to cause, among other consequences, habitat fragmentation, impairing physiology and behavior in fauna.
Ecosystem services	Fisheries	The projects under construction and operation can impact sensitive receptors linked to ecosystem services, such as the local fisheries. Habitat modifications, disturbance associated to noise and vibrations, the increase in population and potential risk for water pollution have the potential to disrupt such activity and negatively impact on the activity and the local fishermen welfare.
Local communities and livelihoods at Malembo, Futila	Local people residing in the Aol – employment opportunity Local businesses, contractors and suppliers – procurement opportunities Influx of workers and population changes	The projects under construction are expected to generate a temporary influx of population in the area due to the increased employment opportunities. The above-mentioned trend can generate adverse effects for the local population, among which company's security policies interfering with the surrounding communities and conflicts resulting by the different ethnics, religions and origins of the workers.

VEC	Impact	Cumulative Effect
		Refinery project and NAIC may share some workers because of the same Contractor, however the interaction will be likely higher with the other two projects. The increase in population can also lead to diverse positive impacts on employment opportunities, procurement and local economy.
	Increase of traffic and use of E220 road	The simultaneous construction activities related to the Port of Caio, the Cabinda Refinery and NAIC Project are expected to generate considerable traffic and congestions on the surrounding roads (namely the E220 road), impacting local communities. This may also increase the risk of accidents between vehicles, or between vehicles and other road users.
Local and regional businesses/organizations	Local businesses, procurement opportunities and services.	It is considered that, by procuring goods, materials and services from local businesses and organizations the impacts of the construction activities could be beneficial for the local economy. However, simultaneous construction activities may cause disruptions in the supply chain located in the province (high amounts of construction materials demand, quarries, etc.)
Workers of the projects	Welfare and living conditions	The construction activities of the surrounding projects can present potential negative impacts on the Project workers, among which increased traffic and associated risk of accidents between vehicles. The population influx due to the increased employment opportunities and contractors whose employees have different origin, might have repercussions on the local economy, with prices increase for both goods and accommodations in the short term and a consequent worsening of the workers' living conditions. In addition, the influx of workers from different regions, eventually pertaining to different ethnic groups or religions presents the risk of conflicts and fractionalization.

Table 3: Preliminary Cumulative effects – Operation

VEC	Impact	Cumulative Effect
Physical system	Increase of pollutant emissions, air quality, and GHGs	Cabinda refinery and NAIC airport are expected to negatively impact air quality due to the emission of pollutants for their normal operations. In addition, sensitive receptors might be impacted in the event of accidents such as fugitive emissions from fuel tanks within the airport boundaries, etc. On the other hand, the Port of Caio and the NAIC airport will likely cause high emissions due to the enhanced traffic linked to their operations.
	Waste management	When all projects will be in operation a certain amount of solid waste will be produced. The Government of Cabinda has declared that the new landfill will be ready for that starting of the projects' operation. Reportedly it was said that the contractor for starting construction has already been selected, but no proof or evidence was provided.
	Use of resources	All the projects under consideration are expected to require considerable amounts of water for their

VEC	Impact	Cumulative Effect
		<p>operations. The simultaneous demand for water might generate critical cumulative impacts causing potential disruptions in the water supply system, irreversible damages on the region freshwater resources and reduced availability of freshwater for the local communities.</p> <p>Similarly, the Projects might require high amounts of energy simultaneously, causing pressure on the local energy supply network that can cause interruption of electricity provision to the local communities.</p>
Habitats, wildlife populations	Flora and fauna disturbance	<p>The projects' operations are likely to critically impact flora and fauna sensitive receptors. The generation of noise, vibrations and increased artificial lighting are found to cause, among other consequences, habitat fragmentation, impairing physiology and behavior in fauna.</p>
Ecosystem services	Fisheries	<p>The projects operations, and in particular the Port of Caio, can critically impact local ecosystem services such as fisheries. Small habitat modifications, disturbance associated to noise and vibrations, the increase in population and the risk for water pollution have the potential to disrupt such activity and impact the fishermen welfare.</p>
Local communities and livelihoods	<p>Local people residing in the Aol – employment opportunity</p> <p>Local businesses, contractors and suppliers – procurement opportunities</p> <p>Influx of workers and population changes</p>	<p>The projects operations are expected to generate an influx of population in the area as a consequence of the increased employment opportunities.</p> <p>The above-mentioned trend can generate adverse effects for the local population, among which company's security policies interfering with the surrounding communities and conflicts resulting by the different ethnics, religions and origins of the workers.</p> <p>The increase in population can also lead to diverse positive impacts on employment opportunities, procurement and local economy.</p>
Local and regional businesses/organisations	Local businesses and procurement opportunities	<p>The projects operations are expected to generate positive impacts on the local economy, namely through the increase in the demand for local goods and services. Possible negative cumulative impacts derive from the simultaneous demand, causing disruptions on the local supply chain.</p>
Users of the Projects	Infrastructures availability	<p>The projects operations can be linked to the increased traffic and the reduced accommodations available in the area in the short term, as a consequence of the population influx. These factors negatively impact the travelers and passengers with short stays in the area, such as the users of NAIC airport and the Port of Caio. However, the Projects will likely generate cumulative positive impacts in the medium and long term, linked to the enhanced public transport network, increase in the services, infrastructures and businesses.</p>
Workers of the projects	Welfare and living conditions	<p>The projects operations can generate potential negative impacts on the project workers, among which increased traffic and associated risk of accidents between vehicles. The population influx due to the increased employment opportunities might have repercussions on the local economy, with prices increase for both goods and accommodations in the short term and a consequent worsening of the workers living conditions.</p>

VEC	Impact	Cumulative Effect
		In addition, the influx of workers from different regions, eventually pertaining to different ethnic groups or religions presents the risk of conflicts and fractionalization.

17.6 Recommendations

The existence of other projects either ongoing, planned or reasonably defined/foreseen have been screened and the potential for high level cumulative effects assessed. Cumulative effects are always difficult to predict as they are the result of complex interactions between numerous projects or activities. This is compounded by the fact that details of future development are largely unknown at this stage. The potential occurrence of cumulative effects has been considered as being possible during construction and operations, however it is considered unlikely, mainly as a consequence of the short duration of construction activities. There are currently a few ongoing or reasonably planned projects in the near future; the currently available information indicates that most of them will be developed according to the same timeline of NAIC project with a high potential for interactions and for the generation of cumulative effects.

NAIC is committed to manage its Project following the highest ES standards as well as to make sure that dialogues are open with the owners and developers of the surrounding projects. Because of the high pressure on the same area in Cabinda and considering that the majority of the projects identified that may have the potential to generate cumulative effects, are stated owned, the developer (MoT) should demonstrate that there is a certain level of coordination with other developers to avoid or minimize these cumulative Impacts. The following measures should be adopted:

- Engagement with local authorities for detailed planning of project activities and identification of any potential for interference and generation of cumulative impacts and of adequate mitigations;
- Engagement in meetings with private project developers to align eventual interferences of their projects with the Project and identify geographical overlaps of the two. This will contribute to reducing the potential for cumulative effects to minor or none;
- Open a dialogue among the public entities involved (Ministry of Transportation, Ministry of Energy and Water resources, Ministry of Environment and local Government) on the mutual exchange of information relevant to project planning and arrange coordination meetings, as necessary, to prevent any risk of cumulative effects;
- Assuming simultaneous construction activities occur, or in case there is the potential for cumulative effects to occur during Project operations, necessary measures will be defined on the basis of detailed engineering and construction schedules of the projects (i.e. avoid certain actions to take place at the same time, as an example actions generating community discontent, or significant noise, or traffic); and
- Take the commitment (as MoT) to prepare a Cumulative Impact Assessment at Local Government Level to evaluate the cumulative impacts in the area before starting the operations or when data of all project designs are available: the Master Plan mentioned during the ESIA study might be a starting point for assessing the area and make sure that all project related risks are captured in a document of regional planning.

An illustrative scheme on how the CIA will have to work is presented in **Figure 9**.



Figure 9: CIA recommended approach (source: IFC Good Practice Handbook)

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