Luxembourg, 09/10/2018

Environmental and Social Data Sheet

Overview	
Project Name:	*Nachtigal Hydropower Plant*
Project Number:	*2015-0526*
Country:	*Cameroon*
Project Description:	*The project consists of the development, construction and operation of the 420 MW Nachtigal dam and hydroelectric power plant on the Sanaga River, 65 km northeast of Yaoundé.*
EIA required:	yes
Project included in Carbon Footprint Exercise[1]:	yes

Environmental and Social Assessment

The Nachtigal Hydro Power Project in Cameroon ("the project") is a run of river scheme with diurnal storage and a rated capacity of 420 MW, being developed by Nachtigal Hydro Power Company (NHPC) on the Sanaga River, 65 km north east from Yaoundé.

The main project components comprise a Roller Compacted Concrete (RCC) main dam 1 455m long and 13.6 m high and equipped with a gated spillway structure, a hydraulic closure dike on the left bank, and a reservoir area of approximately 4 km² with total capacity of around 27 mm³. Reservoir water will be diverted through a headrace channel of 3.3 km to the powerhouse and power will be evacuated through a new 50 km 225 kV Transmission Line (TL) to the Nyom II substation north of Yaounde. A new operators base camp will be constructed and a new access road of 3.2 km from the national route no.1.

All project components will be built and operated by the project promoter, with the exception of the 50 km transmission line and the Nyom II substation. The TL will be constructed by the project promoter and transferred to the Cameroonian public utility company, "Société Nationale de Transport de l'Electricité" (Sonatrel), for its operation. The Nyom II substation will be built and operated by Sonatrel.

If the project had been located within the EU, it would have fallen under Annex I of the Directive 2014/52/EU amending the EIA Directive 2011/92/EU, requiring an Environmental Impact Assessment (EIA) to be carried out for Dams and other installations designed for the holding back or permanent storage of water, where a new or additional amount of water held back or stored exceeds 10 million cubic metres. Under Cameroonian national legislation a similar screening process takes place and the Nachtigal project would require a comprehensive EIA to be developed, which applies to projects of a medium and high scale that may have adverse effects on the environment.

An Environmental and Social Impact Assessment (Etude d'impact environnemental et social, EIES) has been undertaken in 2006-2007, updated in 2011, and an addendum added in 2014

[1] Only projects that meet the scope of the Pilot Exercise, as defined in the EIB draft Carbon Footprint Methodologies, are included, provided estimated emissions exceed the methodology thresholds: above 100 000 tons CO2e/year absolute (gross) or 20 000 tons CO2e/year relative (net) – both increases and savings.

addressing technical modifications to the project and their impacts since the 2011 ESIA. This has been submitted to the competent authority, the Ministry of Environment and Nature Conservation (MINEPDED), who granted a compliance certificate (Certificat de conformité environnementale) in April 2014.

Environmental Assessment

Biodiversity Impacts: The location of facilities has been planned so as to minimize loss of surface areas, secondary forest areas and farmlands. Lands used by the dam and facilities include:

- The flooding of a surface area of 157 ha of vegetation, including 80 ha of secondary forest, 7 ha of under-forest cocoa farms, 4 ha of other crops and 66 ha of shrubby savannah.
- The loss of 159 ha of secondary forest and shrubby savannah due to the location of the future dam, the in - flow canal, the out flow canal, the plant and staff quarters.
- The clearing and temporary use of 134 ha mainly savannah land for site facilities and temporary access.

The project area is located in the semi-deciduous Guinea-Congolese rainforest not within any legally protected area or internationally recognised areas. Congo Forests High Biodiversity Wilderness Area is approximately 10 km to the west of the proposed Nachtigal power station. The closest national park is Mpem et Djim National Park, 63 km to the north of the Sanaga river. Mbam Minkom-Kala Important Bird Area (IBA) and Key Biodiversity Area (KBA) is 45 km to the South-West of the Nachtigal power station, and approximately 2 km west of the project TL. The IBA is highly fragmented and threatened by human pressure (timber extraction, farming, hunting). Given the absence of endemic or protected species, and the small size of the areas concerned, the impact on vegetation is considered not significant. All sites used temporarily will be reforested at the completion of the project.

In-depth biodiversity baseline surveys were undertaken between 2014 and 2016 and attention was given to most sensitive species. The main impact on terrestrial animals and birds will be habitat loss. Inventories conducted in the impacted zones identified:

- Several species of flora as endangered or critically endangered according to the IUCN including Ledermanniella sanagaensis endemic to the Nachtigal falls (Project location) and L. thalloïdea endemic to the Sanaga watershed.
- Several species of wildlife including mammals, reptiles and birds as protected (Cameroonian wildlife legislation) and/or are listed as endangered or critically endangered by the IUCN. The area is not considered as a major migratory route for birds and no migration corridor has been identified along the future transportation line.

Studies showed that suitable habitats in the area are in decline and human impact has scared away the most sensitive wildlife. A Biodiversity Action Plan (BAP) has been developed for the project and measures in the BAP are considered robust and designed to mitigate the project impacts on all species of global and/or national conservation importance.

The Middle Sanaga river system is a critical habitat for nine endemic and/or vulnerable fish species recorded during baseline studies. Movements of some species could be modified because of the obstacle that will be created by the dam and because during the dry season, the downstream part of the reservoir will no longer have water (with the exception of the large branch on the left bank that will still have water from the in-stream flow). These conditions, as well as the creation of water areas with weaker current in the dam, can alter species distribution without accurate prediction. However, the number and size of individual species

that thrive in calmer waters could increase. The situation of fish downstream of the refill will hardly change with little higher flows only in the dry season, although when the dam will stop releasing predation by birds will be considerable.

A number of fish plans have been developed to mitigate these impacts and will be adapted based upon future monitoring activities. Measures include the restoration of fish habitats in tributaries, both along the Middle Sanaga and in the Mpem & Djim Park, catch-and-release programmes (though no longitudinal-migrating fish species were identified during 2014 fish surveys) and construction water quality controls. Certain species preferring lentic habitats such as various species of “cat-fish” will be fostered by the creation of the reservoir upstream of the dam.

Provided the biodiversity measures are implemented successfully, the project is expected to achieve a net gain in biodiversity.

Environmental flow: Provision has been made for a minimum environmental flow release (EFR) into the dewatered left bank channel downstream of the dam of 25 m³/s guaranteed, with the option to increase this to 47 m³/s depending on downstream requirements as defined by future biological monitoring and analysis. This provision is consistent with the objective of restoring dry season flow conditions in the dewatered section of the river closer to their natural state, and thereby improving habitat conditions for the identified critical aquatic plant species, Ledermaniella sanagaensis (LS). It is recommended that the EFR regime is refined and adapted over time as further data collection is undertaken.

Water Quality: The most significant water quality risks arising from the project relate to potential pollution from construction activities (e.g. from contaminated and/or sediment runoff), and during operation from deteriorating water quality conditions in the reservoir and downstream releases, e.g. due to eutrophication and/or land-use changes in the upper catchment. Construction related pollution risks are addressed in the ESIA (and subsequent IFC ESAP), and standard construction pollution prevention and control measures have been incorporated in the environmental management plan/sub-plans that will embedded in the EPC contracts for general civil works etc.

Dam safety: A draft Emergency Preparedness and Response Plan for the construction phase has been provided by the main contractor and provides a general approach to management of emergency situations. However, it is not site- or project-specific and will require to be updated prior the start of construction. An Emergency Preparedness and Response Plan for the operational period will further be developed following the finalisation of the dam break analysis, which will be launched after the completion of the detailed design.

Cumulative Impact Assessment: A Cumulative Impact Assessment (CIA) for Nachtigal and other planned hydropower and infrastructure developments in the Sanaga basin was carried out in 2011. The CIA addressed impacts at basin level, including potential hydro-morphological effects on the Sanaga river and cumulative biodiversity impacts at basin level, and included costed recommendations for future environmental baseline monitoring, community land-use planning and improved agricultural and livestock management practices etc. A key recommendation was for the establishment of the Sanaga Basin Commission and development and implementation of an Integrated Water Resources Management Plan (IWRMP) to sustainably plan and manage the various developments in the basin, including but not limited to hydropower. NHPC will be a member of the executive committee of this commission. The development of the plan and the functioning of the Commission are critical to managing cumulative impacts on the Sanaga river.

Climate change impacts: Studies used by NHPC indicate that Sanaga Basin runoff variation is expected to stay in the range of -20% to +20%, that by 2050 long-term average hydro

power generation by the Nachtigal power plant could vary between -15% and +5% of the base case value (present hydrology) and that the Nachtigal project is economically robust and climate resilient. However, study data needs to be updated and risks associated with climate change will be further developed.

EIB Carbon Footprint Exercise

The direct greenhouse gas emissions from a hydropower plant are related to the emissions from the reservoir. For the project, the reservoir will mainly follow the existing riverbed and the increase in water surface area is only 4 km². According to the Bank's methodology for reservoir emissions the total CO2-equivalent emissions are estimated at 19.5 thousand tonnes per year.

In accordance with the Bank's current Carbon Footprint methodology, it is calculated that based on the avoidance of electricity generation from a combination of existing and new power plants in Cameroon, the total relative effect of the project is a net reduction in CO2 equivalent emissions estimated at 560 thousand tonnes per year.

For the annual accounting purposes of the EIB Carbon Footprint, the project emissions will be prorated according to the EIB lending amount signed in that year, as a proportion of project cost.

Social Assessment

The project's main social risks and impacts relate to involuntary resettlement impacts, impacts on cultural heritage, community health, safety and security risks as well as labour and working conditions.

Involuntary Resettlement: the construction and operation of the project will result in temporary and permanent impacts on land, structures, crops, trees, fishing and sand mining grounds, which will lead to physical and economic displacement. To address these impacts, two Resettlement Action Plans (RAPs) (one for the dam, reservoir and hydroelectric power plant component and the other for the transmission line and the base camp components) and a Livelihood Restoration Plan have inter alia been prepared and will be implemented. More specifically, it is expected that:

- *As a result of the dam component:*

Four villages – Ndji, Ndokoa, Minkouma and Bindandjengue, with a total population of about 1 470 inhabitants, will be directly impacted in the dam area. In these villages, two households with a total of five project-affected persons (PAPs) will have to be physically relocated and the agricultural plots of 147 PAPs (corresponding to 138 households and amounting to about 143 ha) will have to be further acquired. Affected villages will also lose access to forest resources.

Fishing will be prohibited in the dam area from the start of construction to reservoir filling. Due to safety reasons, following reservoir filling, fishing will continue to be prohibited in the stretch from the dam to the turbines and 500 m upstream of the dam, but will be otherwise allowed in the reservoir. Fishermen will have to adapt to the new fishing conditions in the reservoir. As a result of these restrictions and changes in fishing activities, around 117 fishermen and 83 fish traders are expected to be impacted on the short and longer-term. A Fishing Action Plan will be developed to address the specific project impacts on fishermen and fish traders during construction. Other mitigation measures for addressing the above-mentioned dam-area impacts have been identified in the relevant RAP and the Biodiversity Action Plan and will be

implemented accordingly. These include individual and collective in kind and cash compensation and livelihood restoration measures, relocation assistance as well as assistance for adapting to the new fishing conditions in the reservoir during operation.

Due to changes in flow, which will limit the availability of sand, the dam component is further expected to impact sand mining activities from the dam area until the confluence of the Sanaga and Mbam rivers, about 50 km downstream of the reservoir. This will also impact a number of indirect jobs (e.g. manufacturing of canoes, food catering, lodging, transportation) and additional revenues for districts and villages (e.g. which benefit from a percentage of the "extraction tax"). The Livelihood Restoration Plan (LRP) has been developed to address impacts on sand mining and other related activities. The LRP will be supplemented by a related socioeconomic baseline analysis and monitoring and evaluation plan.

- *At the level of the base camp component:*

The promoter's base camp for the operational period will be established in the town of Batchenga in an area of 19 ha. This will not lead to any physical displacement but will result in the loss of agricultural land for 207 PAPs from the villages of Emana-Batchenga and Balong I. The mitigation measures for addressing this impact, including in kind and cash compensation options, have been identified in the relevant RAP.

- *Along the 50 km transmission line route*:

The transmission line will run through 25 villages (with a total population of about 35 500 inhabitants) and is expected to impact 565 PAPs through temporary or permanent losses of crops and land within a 50 m wide right of way. The route of the transmission line having been designed to minimise physical displacement, only three households are expected to require relocation. The mitigation measures for addressing these impacts have been identified and will be implemented in line with the modalities captured in the relevant RAP.

In addition to the above-mentioned Resettlement Action Plans and Livelihood Restoration Plan, the project will develop and implement a Resettlement Framework which will inter alia outline the compensation modalities for any accidental damages to crops, property and cultural heritage during works, any damages to/removal of trees beyond the 50 m wide TL right of way because of safety reasons and any additional impacts stemming from land acquisition or land use changes.

Ahead of the TL handover for the operational period, the promoter will conclude tripartite agreements with Sonatrel and affected communities along the TL route, which will establish the compatible uses under the TL during operation, the complaint management and resolution procedure in case of damages to crops and the respective compensation matrix.

Cultural Heritage: an archaeological study was undertaken as part of the ESIA process and resulted in a specific archaeological management plan. Several sacred sites were identified, but some of their exact locations are still in the process of being documented and the compensation modalities to be agreed with project-affected persons.

Community Health, Safety and Security: the project has anticipated health and safety risks and impacts on surrounding communities, including linked to the expected influx of job seekers. Several related management plans are detailed in the ESMP and are required as part of the main contractor's integrated management plans. Amongst others, a health study was completed to understand the epidemiological profile and the condition of the public health infrastructure in the area and a Community Health Action Plan was developed.

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To address the significant influx of job seekers expected during construction and to mitigate the risks to surrounding communities, the project has produced an Influx Management Plan and has further committed to maximising local hiring.

Security planning has also started and given that the project is classified as a project of national interest, a memorandum of understanding is expected to be signed with the relevant government entities. A Security Management Plan which will outline the project's security arrangements and roles and responsibilities of the different parties, including of the relevant government entities, will be produced.

Labour and Working Conditions: the promoter has a current workforce of about 45 employees, which will increase to 180 employees during operation. An average of 800 workers are expected during the 57-month construction period, with 1,500 workers at peak. The TL workforce is estimated at less than 200 workers at peak construction. About 60% of the required workforce is expected to be hired locally. A construction workers' accommodation camp and a new operator's base camp will house non-local workforce.

Working conditions and terms of employment for promoter employees are defined in an internal work regulation document approved by the Ministry of Labour of Cameroon. A project labour commitment (policy statement) will be further produced. To manage indirect workers, the promoter will include labour obligations in tenders and contracts and monitor the contractors' compliance with the latter. Particular attention will paid to ensure that workers are aware of and have access to a worker grievance mechanism and that the construction workers' accommodation camp is built and operated in line with industry standards.

Public Consultation and Stakeholder Engagement

Public hearings were held at each stage of the ESIA process, and tailored community consultations have further been undertaken and will continue throughout the resettlement planning and implementation processes.

The project has developed and is implementing a Stakeholder Engagement Plan (SEP), including a grievance mechanism, and will enhance its E&S team by hiring additional Community Liaison Officers (CLO) to ensure the continuous and effective engagement of affected and interested parties, in particular surrounding communities. The SEP is expected to be updated accordingly.

Other Environmental and Social Aspects

The project promoter has an environmental and social team in place with appropriate capabilities, and has identified additional roles to increase its in-house E&S capacity for the next stages of the project.

An Environmental and Social Management System (ESMS) outlining the specific procedures and the roles and responsibilities of the different actors, including of the promoter and contractors, to manage the environmental and social obligations of the project will be further developed and implemented.

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Conclusions and Recommendations

A review of the project and ESIA documentation has identified that the project is well advanced for the current stage of the project cycle, with comprehensive technical, environmental and social work done to date. An Environmental and Social Action Plan (ESAP) has been developed, which includes conditions and undertakings to address gaps with the EIB's Standards and which will be part of the financing contract. Specific conditions and undertakings for financing, as captured in the ESAP, include:

Prior to contract signature:

- Updated Stakeholder Engagement Plan;
- Resettlement Framework;
- Socioeconomic baseline analysis and monitoring and evaluation plan related to the Livelihood Restoration Plan;

Prior to first disbursement:

- Construction Fishing Action Plan;
- Security Management Plan in form and substance satisfactory to the EIB;

Condition to All Disbursements

- Each of the action items listed in the ESAP and the ESMP has been fulfilled in accordance with the Environmental and Social Requirements and the timetable set forth therein and to the satisfaction of the EIB.

Undertakings:

- Construction Environmental and Social Management System (ESMS) in form and substance satisfactory to the EIB prior to the start of construction;
- Operational ESMS in form and in substance satisfactory to the EIB prior to the start of operation;
- Signed tripartite agreements with Sonatrel and affected communities at the Transmission Line Handover;
- Final mapping of impacted sacred sites and evidence of compensation agreements with project-affected persons or their representatives prior to the start of construction on the relevant project component;
- Emergency Preparedness and Response Plan for the construction period and the Dam Safety Emergency Plan for the operational period prepared to the satisfaction of the EIB respectively 1 month prior to the start of construction and 6 months prior to reservoir filling;
- Adaptive Environmental Flow Release Strategy satisfactory to the EIB;

The E&S aspects of the project are aligned with the Bank's E&S Standards, and with the above conditions and undertakings in place, the project is considered acceptable for EIB financing in E&S terms.

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