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ENVIRONMENTAL AND SOCIAL REVIEW SUMMARY (ESRS)
PROJECT Nachtigal # 37673

Disclaimer

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Project Description:

Nachtigal Amont HPP ("Nachtigal") is a 420 MW run-of river hydropower plant (HPP) located in the Sanaga River, 65 km north east from Yaoundé (Cameroon). The project is being developed by Nachtigal Hydro Power Company ("NHPC") whose shareholders are EDFI (40%), the Republic of Cameroon (30%) and IFC (30%). Construction of the project is estimated to cost around 1.05 billion EUR. In addition to IFC's equity as project developer, the proposed investment is up to 130 million EUR A loan. IFC will also act as Global Coordinator for up to 650 million EUR of parallel loans in Euros or in local currency. The World Bank (WB) is engaged in the power sector in Cameroon providing advice on the Electricity Sector Development Plan covering the period 2015-2035 ("PDSE 2035") and developing a Technical Assistance project for hydropower development on the Sanaga River that should also support Nachtigal and the overall sector framework. WB will provide a Partial Risk Guarantee (PRG) to this project.

Construction is organized in four separate engineering, procurement and construction (EPC) contractor tenders: (i) civil works (LOT GC), (ii) installation of electro-mechanical equipment (LOT EM1), (iii) construction of high and medium voltage transmission lines (LOT EM2), and (iv) construction of NHPC base camp (LOT CE). Construction is expected to start in early 2018 and commissioning of the last turbine is expected in 2022. The project's main components include:

- A roller compacted concrete dam on the Sanaga River, comprised by an overflow section with a total length of 1455 m and maximum height of 13.6 m, and a non-overflow section with a length of 553 m and a maximum height of 16 m to create a 27.8 million m^3 reservoir with a surface of 4.21 km^2 at normal operating level.
- A headrace lined canal about 3.3 km long and 14m deep on average to transfer water to the hydroelectric power plant with a maximum flow rate of 980 m^3/s corresponding to the design flow of the hydroelectric power plant equipment.

- A hydroelectric power plant with an installed capacity of 420 MW (seven 60 MW Francis turbines able to operate either as a run of river plant or an intermediate peaking plant).
- A secondary 4.5 MW power plant to generate electricity from the environmental flow (riparian release) to be discharged downstream of the dam.
- A double busbar 225 kV generation substation and a 50.3 km 225 kV double circuit transmission line equipped with two bundle conductors to transport the power produced from the power plant generation substation to the Nyom 2 connection substation.
- Spoil disposal areas for the temporary storage of approximately 1.8 million m^3 of excavated material.
- A quarry for the extraction of approximately 170,000 m^3 of laterite.
- A concrete plant to produce approximately 130,000 m^3 of concrete.
- 6.5 km of permanent roads to access the hydroelectric power plant and dam.
- A temporary construction base camp with capacity for up to 1,500 workers.
- A 1 ha temporary landfill for the sorting, pretreatment and disposal of non-hazardous solid waste generated by EPC contractors and NHPC offices and base camp.

NHPC has a 35-year operation concession of the hydropower plant (and relative generation substation), while the transmission line will be built by NHPC and then transferred to the State of Cameroon to be operated by SONATREL. The HPP will be operated mainly as a baseload power plant. Nachtigal HPP will form part of a hydropower cascade on the Sanaga River. Lom Pangar regulation reservoir, funded in part by the World Bank, is located upstream from Nachtigal. With a storage capacity of 6 billion m^3 reservoir, this large dam was completed in 2016; its main purpose is to regulate water flows along the Sanaga river to increase hydroelectric production by two existing and seven planned HPP located downstream. The two existing HPPs on the Sanaga River are the 384 MW Song Loulou and 277 MW Edéa HPPs, and the six large HPPs proposed downstream of Nachtigal HPP as part of a cascade along the Sanaga River include Nachtigal Aval (200 MW), Kikot (540-1000 MW), Grand Ngodi (1140 MW), Song Mbengué (1140 MW), Song Ndong (250 MW) and Edea Amont (capacity not specified).

Overview of IFC's Scope of Review:

Since joining the project consortium in 2013, IFC has reviewed and commented on all environmental and social (E&S) studies and documents prepared for the project, including an Environmental and Social Impact Assessment (ESIA) prepared by the consortium Aecom/Artelia/Ere in 2006 and updated in 2011, as well as complementary baseline studies (e.g. noise, air quality, health, biodiversity) and associated mitigation plans commissioned between 2014 and 2016 to meet international standards. IFC has also reviewed comments provided by an independant panel of experts (one environmental, one social and one health expert) retained to review all environmental and social (E&S) studies and plans commissioned by NHPC.

IFC E&S Specialists visited the site in April 2015 and December 2015 to review baseline studies and mitigation plans with NHPC's E&S team and to meet the Ministries of Forestry and the Environment as well as conservation agency IUCN and conservation NGO WWF. A joint WB/IFC appraisal visit took place on November 14 – 18, 2016. The appraisal included interviews with NHPC's CEO and E&S team, meetings with local authorities in Batchenga, and meetings with Affected Communities in the villages of Ndji and Ndokoa.

Identified Applicable Performance Standards:

While all Performance Standards are applicable to this investment, IFC's environmental and social due diligence indicates that the investment will have impacts which must be managed in a manner consistent with the following Performance Standards

PS1: Assessment and Management of Environmental and Social Risks and Impacts
PS2: Labor and Working Conditions
PS3: Resource Efficiency and Pollution Prevention
PS4: Community Health, Safety and Security
PS5: Land Acquisition and Involuntary Resettlement
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
PS8: Cultural Heritage

This project does not trigger PS 7 Indigenous People as no indigenous peoples have been identified in the project's area of influence.

If IFC's investment proceeds, IFC will periodically review the project's ongoing compliance with the Performance Standards.

Environmental and Social Categorization and Rationale:

Nachtigal involves the development of a large scale 420 MW HPP, including a 15 m high and 2,000 m long dam, a reservoir with a surface area of 421 ha, and the partial dewatering of a 3.3 km river stretch. The project will form part of a hydropower cascade which will have cumulative impacts. Nachtigal is located in natural and modified habitats where terrestrial and aquatic biodiversity values exist. The project will directly impact 919 PAPs through agricultural land expropriation and restrictions on use, and approximately 120 fishermen, 80 fish traders and 900 sand miners will be temporarily or permanently economically displaced. During its peak construction period, the project will employ a workforce of nearly 1500 of which approximately one-half will be provided accommodation with the attendant stress that such a population influx

will have on the cost of goods and services, public security and social cohesion. Given all these factors and in accordance with the IFC Policy on Environmental and Social Sustainability, Nachtigal has been designated as a Category A project because it may cause significant adverse E&S impacts that may be diverse and irreversible.

Environmental and Social Mitigation Measures

IFC's appraisal considered the environmental and social management planning process and documentation for the project and gaps, if any, between these and IFC's requirements. Where necessary, corrective measures, intended to close these gaps within a reasonable period of time, are summarized in the paragraphs that follow and (if applicable) in an agreed Environmental and Social Action Plan (ESAP). Through the implementation of these measures, the project is expected to be designed and operated in accordance with Performance Standards objectives.

PS 1 - Assessment and Management of Environmental and Social Risks and Impacts

Identification of Risks and Impacts: The Environmental and Social Impact Assessment (ESIA) was commissioned by Alucam (previous project developer) for the consortium Aecom/Artelia/Ere in 2006 and was then updated in 2011, following which complementary studies were undertaken after the involvement of IFC and EDF (see below). The scope of the updated ESIA includes the main components of the project and ancillary infrastructure such as the transmission line, access roads, quarries, and spoil disposal areas, among others. The environmental compliance certificate was obtained from the Government of Cameroon in 2014 under the condition that the E&S management plan was updated and expanded. In 2014, owing to the involvement of EDF and IFC as project developers, a series of complementary studies were commissioned to update the evaluation of project impacts and define detailed mitigation plans with regards to: (a) land acquisition and involuntary resettlement of project affected people (PAP) around the dam and along the transmission line; (b) economic displacement of sand miners; (c) loss and fragmentation of habitat for aquatic and terrestrial fauna and flora; (d) migratory influx; (e) public health; (f) cultural heritage; (g) pollution prevention during construction; (h) opening of a laterite quarry; and (i) installation of a sort/transfer/landfill station. The complementary studies were completed from November 2014 to March 2017. The Ministry of Environment, Nature Protection and Sustainable Development (MINEPDED) issued the certificate of compliance with E&S requirements in April 2017.

A detailed cumulative impact assessment (CIA) was conducted for Lom Pangar HPP and other downstream hydropower projects, including Nachtigal HPP (AECOM, 2011), which mainly focused on the potential negative impacts on the estuary of the Sanaga. To address the impacts identified in the CIA, the Electricity Development Corporation (EDC) of Cameroon is commissioning an Integrated Water Resources Management Plan (IWRMP) for the Sanaga river.

The project ESIA includes a brief analysis of Nachtigal HPP's cumulative impacts on the Sanaga's hydrology and hydrodynamics. The assessment concludes that Nachtigal will not modify the river's hydrology and that the main impacts will derive from the flow regulation effect of the Lom Pangar dam upstream. While the ESIA identified the reduction in the transportation of sediments downstream from Nachtigal HPP as a potential impact, a subsequent study conducted by a consulting firm in 2014, evidenced the significant reduction in sand sediments along the Sanaga river due to sand mining operations. Therefore, the study concludes there should be no significant additional impacts on the river morphology due to the sediment retention effects by the Nachtigal dam. Aquatic ecology impacts associated with the Lom Pangar HPP upstream are discussed in the PS 6 section below.

A study commissioned by the World Bank in 2014 on the impact of climate change on hydropower in Cameroun concluded that the Lom Pangar and Nachtigal storage and hydropower projects are economically robust and climate resilient projects. The study concluded that based on the presently available climate projections for the 21st century, the energy generation by the Edea, Song Loulou, Lom Pangar and Nachtigal power plants could vary between -15% and +5% by 2050; results for 2080 are similar.

Management Programs: All E&S mitigation measures listed in the ESIA and complementary studies have been consolidated in an Environmental and Social Management Plan (ESMP). For each mitigation measure, the ESMP describes: (i) the activities to be performed; (ii) organizations responsible for implementation; (iii) reference to EPC contractual requirements in tender dossiers when applicable; (iv) performance indicators and monitoring protocols; and (v) assigned budget. E&S mitigation measures linked to construction activities were incorporated in the tender dossiers for the four EPC contractor LOTs (GC, EM1, EM2, CE). These requirements have been included by the EPC Contractors in their preliminary Integrated Environmental, Health & Safety and Social Management Plans and accompanying sub-plans (e.g. waste management plan, hazardous materials management plan, etc.), which have been presented as part of their technical offers. All this documentation has been evaluated by EDF Center of Hydraulic Engineering (EDF-CIH) as part of the tender process. Finalized versions of EPC contractors' Integrated Environmental, Health & Safety, and Social Management Systems shall be submitted to IFC prior to the commencement of construction works (see ESAP action no. 1).

Before commissioning of Nachtigal HPP, NHPC shall develop an E&S management system in line with the requirements of IFC Performance Standard 1 to mitigate the E&S risks and impacts linked to the operation of the hydropower plant (see ESAP action no. 2 and 3). Likewise, before commissioning and during the 35-year operation concession, NHPC shall ensure its E&S team has the capacity to effectively manage the E&S risks and impacts linked to the operation of the hydropower plant (see ESAP action no .4).

Organizational Capacity and Competency: **NHPC's E&S team** is comprised of seven qualified professionals who have been on site since 2014 playing an active role in the identification of the project's E&S risks and mitigation measures, and ensuring the implementation of an effective stakeholder engagement strategy and grievance mechanism. The team, with the support of qualified consultants, has also actively participated in the government-led census of land to be expropriated to ensure that the resettlement action plans comply with IFC Performance Standards. NHPC's E&S team will remain on-site for the duration of construction, ensuring continuous engagement with communities. In addition, NHPC will hire six additional professionals to ensure the implementation of the ESMP and the complementary mitigation action plans (i.e. resettlement action plans, livelihood restoration for sand miners, management plan of migratory influx, cultural heritage action plan, biodiversity action plan).

EDF-CIH will act as Assistant to the Contract Authority (AMOA for its acronym in French) to ensure that execution of works by the EPC contractors comply with established cost, quality, delivery deadlines, as well as compliance with EHS contractual requirements. AMOA will retain one Safety Engineer (57 months), one Environmental Engineer (42 months), and one EHS inspector to monitor contractors' EHS performance. All EPC contractors will also appoint their own personnel for the implementation of their integrated management plans.

NHPC (through AMOA) will plan regular meetings that must be attended by all EPC contractors. NHPC and the AMOA will have the authority to issue immediate full or partial stop work orders to any of the EPC contractors if unsafe working conditions are detected until remedial works required to secure site safety have been carried out.

Emergency Preparedness and Response: All EPC contractors have drafted emergency preparedness and response plans, which will be reviewed and integrated in coordination with the AMOA to ensure actors can effectively respond in case of an emergency. NHPC shall likewise develop an emergency preparedness and response plan to address emergency situations during the operation of the hydropower plant. This plan will include adequate warning systems and other measures to address flood events, rapid water level rises in case of peaking power production and potential dam failures (see ESAP action no. 18, described under PS4–Dam Safety below).

Monitoring and Review: As part of their E&S Integrated Management Systems, EPC contractors shall implement regular inspections, quarterly internal audits, and senior management reviews. A summary of the results with associated corrective measures shall be regularly submitted in due time to NHPC (see ESAP action no. 1). EPC contractors will also present monthly reports to NHPC covering key E&S performance data, deliverables and KPIs. This information shall be analyzed by NHPC to evaluate contractors' E&S performance and take the necessary corrective actions (ESAP action no. 2). The information shall be also summarized in Quarterly E&S Monitoring Reports to be presented to IFC during the entire duration of the construction. The reports will also

include information on the progress status of the implementation of all E&S action plans and the effectiveness of the mitigation measures. Monitoring and Review during operations will be an integral component of NHPC's E&S Management System (see ESAP action no. 2 and 3). Regular E&S Monitoring Reports shall be presented to IFC throughout the duration of the loan.

PS 2 – Labor and Working Conditions

NHPC has a current workforce of about 45 employees and will have a total of about 180 employees during operation of the hydropower plant. Working conditions and terms of employment for NHPC employees are defined in an internal work regulations document approved by the Ministry of Labor of Cameroon in 2017. The Government of Cameroon has ratified all ILO fundamental conventions. All employees will be provided with a copy of their contract and the internal work regulations at recruitment. NHPC shall also document, implement and communicate human resources policies and procedures in line with IFC Performance Standard 2 requirements (see ESAP action no. 5).

The project has a 57 months construction schedule and the workforce will number approximately 1500 at peak construction. Approximately half of the total staff working for EPC contractors responsible for civil works (LOT GC) and for the installation of electro-mechanical equipment (LOT EM1) will be housed in a workers accommodation that will form part of the main construction base camp. Local workers will be allowed to live in their home villages. Transportation from their home villages (up to a maximum distance of 35 km) to the construction site will be provided daily by the EPC contractors. Staff working for the EPC contractor responsible for the construction of the 225kV transmission line (EM2) will lodged by their own means, most of these will be local workers. This workforce will number less than 200 at peak construction. Transportation to the construction site will be provided daily from the EM2 EPC contractor base camp to the work sites.

During the duration of construction, NHPC shall monitor contractors to ensure they comply with the Labor Code of Cameroon and IFC Performance Standard 2 requirements. In particular, NHPC shall regularly monitor that (i) contractors have internal work regulations approved by the Ministry of Labor of Cameroon which are communicated and explained to employees at the time of recruitment; (ii) workers are covered by social security; (iii) workers are provided with a copy of their contract; (iv) no workers' personal identification is retained against their will; (v) contractors have a system to adequately record and compensate for overtime work; and (vi) workers' wages comply with the remunerations established by applicable collective bargaining agreements or official tariffs (see ESAP action no. 6). NHPC shall also ensure that contractors have a system to verify workers' age, and that no children below the minimum working age (15 years) is engaged in any type of work and no children between 15 and 18 years old is employed in hazardous work

(see ESAP action no. 7). NHPC shall ensure that EPC contractors make all workers aware of the existence of a worker grievance mechanism managed by the EPC contractors with NHPC input, and shall facilitate access to it (see ESAP action no. 8).

The EPC contractor for civil works (LOT GC) is responsible for the construction and maintenance of their construction basecamp and shared basecamp facilities (recreation, medical center, etc.), and for the provision of basic services. The EM1 EPC is responsible for the construction and maintenance of their construction basecamp (accommodation and construction facilities) and will pay a fixed fee to access the basic services provided by the GC EPC contractor (water, electricity). The GC EPC contractor has provided detailed plans of the accommodations and the services that it will provide as part of its technical offer. These plans are in line with good industry practice. During construction works, NHPC shall regularly monitor the workers' accommodation provided by the GC and EM1 EPC contractors to ensure that it complies with contractual clauses and workers are provided a safe and healthy living environment. If non-compliances are identified, NHPC will require the GC and EM1 EPC contractors to take immediate corrective actions (see ESAP action no. 9).

As part of the technical offers, each EPC contractor has provided a preliminary Occupational Health & Safety Plan and job hazard analyses. NHPC will supervise that these plans are finalized and implemented through awareness communication, training, implementation of controls, and provision of adequate personal protective equipment (PPE). Each contractor is responsible for the training of its own personnel and visitors. The Occupational Health & Safety Plan of the GC EPC contractor includes mandatory EHS training to its workers before accessing the construction site; the training will last 0.5 days for skilled workers and accompanied visitors and 3 days for non-skilled workers. Training on basic trades for non-skilled workers (e.g. engines driver, formwork carpenter, crane operator, etc.) also includes safe work procedures and required personal protective equipment (PPE). Additional EHS training on aspects such as first aid, fire brigades, job safety analysis, work permits for hazardous jobs, toolbox meetings, pre-task briefings, work in confined spaces, etc., will be mandatory for managerial staff and team leaders. Training will be delivered by qualified personnel and its effectiveness will be evaluated. The GC EPC contractor will also implement a safety awareness and communication campaign which will include information panels in all its work zones, toolbox meetings, pre-task briefings, annual safety and environmental time out, and the HSE Chairman's Award. The EM1 and EM2 EPC contractors have similar training plans. The EM1 and EM2 EPC contractors have developed an EHS training matrix defining the required training for each job category.

PS 3 – Resource Efficiency and Pollution Prevention

Pollution prevention during construction: Mitigation measures at the construction site will include standard construction pollution prevention and control measures, such as (a) solid and hazardous waste handling and disposal; (b) domestic/camp wastewater treatment; (c) storage and handling of hazardous materials; (d) housekeeping; (e) control of erosion and storm water runoff; and (f) noise, vibrations, and dust abatement measures; among others. These mitigation measures have been outlined by the EPC contractors for the activities under their responsibility. The EPC contractor for civil works (LOT GC) has included in its environmental management plan and sub-plans (i.e. waste management plan, hazardous materials management plan and effluents management plan). Potential pollutants in wastewater from concrete batching plants include cement, sand, aggregates and petroleum products. These substances can adversely affect water quality by increasing the pH and turbidity. As the project will require 130,000 m^3 of concrete, the GC has integrated in its environmental management plan the installation and operation of settling pits to treat wastewater from concrete batching plants as included in the project's ESMP. Fugitive dust can be a serious nuisance for workers and communities close to the construction site and along access roads. Fugitive dust control measures proposed by the GC EPC contractor include covering trucks hauling loose materials and cleaning mud off truck wheels. NHPC shall ensure that these mitigation measures are effective and require the GC EPC contractor to implement further mitigation measures if necessary.

The GC EPC contractor will put in place a waste sorting/transfer station and landfill. Non-hazardous waste produced by the other EPC contractors and their subcontractors and NHPC offices and base camp in Batchenga will also be treated or finally disposed in this sorting/transfer/landfill station. An environmental impact assessment for the sorting/transfer/landfill station was commissioned by NHPC in 2016. The operation mode and mitigation measures were included in the tender dossier for LOT GC and are outlined in the contractor's environmental management plan. The environmentally sound disposal of hazardous waste will be the individual responsibility of each EPC contractor. The GC EPC contractor has already identified an authorized company for the treatment of recyclable dangerous waste (i.e. used oils, used tires, batteries, CFLs) and will identify authorized companies for the treatment of medical waste, non-recyclable dangerous waste (i.e. oil rags), and non-hazardous recyclable materials before the commencement of the works. The other EPC contractors (EM1 and EM2) will also identify authorized companies for the treatment of all hazardous (recyclable or not) and medical waste.

A monitoring plan will be put in place by the EPC contractors to regularly monitor effluents and emissions under their responsibility: (a) treated domestic/sanitary effluents; (b) treated effluents from concrete batching plants; (c) treated lixiviates from landfill station (GC only); (d) treated drainage from mechanical workshops; (e) air emissions from diesel generators (GC only); and (f) particulate emissions along access roads and sensitive receptors (GC only). Results will be reported as part of the EPC contractors' monthly report to NHPC. In addition, NHPC will monitor water quality in the Sanaga river. NHPC will review this information to ensure that effluents and

air emissions comply with Cameroonian regulations and applicable IFC EHS Guidelines. If non-compliances are identified, NHPC will require the responsible EPC contractor to implement immediate corrective actions.

The construction of the concrete dam and channel will require about 1.8 million m^3 of soil and rock to be temporarily or permanently stored on site. Additionally, 157 ha will be permanently and 134 ha will be temporarily cleared of vegetation for project components, the laterite quarry, and installation of the basecamp. The topsoil, amounting to approximately 270 thousand m^3, will be stored separately to be used for revegetation purposes. Waste rock and soil from excavations will be reused in other civil works. Nonetheless, the mix of rocks and soil used in the cofferdams will have to be permanently disposed at the end of construction as this will not be suitable for other civil works. Before any earthworks take place, the GC EPC contractor shall present NHPC a spoil management plan detailing the areas where the material will be temporarily stored and the measures to avoid erosion and deposition of sediments in the Sanaga river. For materials requiring permanent storage, the GC EPC contractor shall update the spoil management plan to detail permanent storage areas and management before the end of the construction phase (see ESAP action no. 10). No additional land will be acquired for the temporary or permanent storage of spoil.

Pollution prevention during operations: The risk of eutrophication of the reservoir is considered low as the only industrial effluents from a sugar refinery located upstream (1-2 m^3/s) are minimal compared to the flow of the Sanaga river (650 m^3/s during the dry season with water flow regulation from the Lom Pangar dam). In addition, the maximum water residence time in the reservoir (27.8 million m^3) is estimated to be 12 hours only. The main water quality risk during operations is associated to a potential future increase in the agricultural development of the surrounding area. The infestation of the reservoir with water hyacinth was not identified as a risk by the ESIA. Nevertheless, NHPC will constantly monitor the presence of water hyacinth in the reservoir to prevent the spreading of this water pest. To avoid contamination of the river downstream the powerhouse, NHPC will install water oil separators to remove any oil that might leak from the equipment.

GHG emissions: The area to be flooded is composed of 112 ha of forest on the right river bank and islands, and 108 ha of shrub savanna. The forest is mainly composed of heavily modified secondary forests with cacao plantations. The presence of valued timber is very limited. Based on a multi-criteria analysis performed by EDF-CIH, NHPC has decided not to remove the vegetation from the area to be submerged. Maintaining the vegetation will provide favorable habitat for the reproduction of fish, and the benefit of the short water residence time is that the quality of the water (concentration of O_2) will depend more on the quality of the entering flow than on the decomposition of organic material inside the reservoir. A partial removal of the vegetation will be considered to facilitate access to the reservoir by fishermen. In addition, estimated emissions of Greenhouse Gases (GHG) from the submerged aerial vegetation (77,000 teqCO_2) are limited over

the long term compared to expected annual GHG emissions from the reservoir (150,000 teqCO_2 per year). Total emissions will translate on a GHG emissions intensity of around 0.07 teqCO_2/MWh considering an expected annual electricity generation of 2,250 GWh. From the perspective of net GHG emissions, the project will decrease the average GHG emissions intensity of the electrical grid in Cameroon from about 0.2 to 0.17 teqCO_2/MWh.

PS 4 – Community Health, Safety and Security

Migrant influx in Affected Communities: The villages that will likely see a migrant influx are Ndji (estimated population 849), Ndokoa (pop. 273), Minkouma (pop. 122), Olembe (pop. 637), Nalassi (pop. 642), Emana-Batchenga (pop. 1353), and Ballong I (pop. 1493). To limit the influx of migrants, the EPC contractors have committed to maximizing local hiring. It is anticipated that about 60% of the required workforce (all EPC contractors combined) will be hired locally. The EPC contractors have also committed to implementing a work schedule that allows migrant workers to regularly return home so that it dissuades families of workers to move into the area. In addition, to promote local employment, the EPC contractors will put in place shuttle buses to daily transport workers from/to their homes up to 35 km from the worksite. To control interactions between migrant workers and Affected Communities, the GC EPC contractor will install a fenced base camp able to receive up to 700 workers (GC and EM1). Each EPC contractor has developed a code of conduct and disciplinary procedures that will be explained to its workers at the time of induction and will be posted in French and local languages around the base camp. The code of conduct includes rules related to aspects that affect neighboring communities. NHPC shall ensure that the code of conduct and disciplinary procedures also include the prohibition to engage in any type of sexual behavior with minors and any type of abuse or violence against women (see ESAP action no. 11), and shall implement a communication campaign to raise awareness on what is the expected behavior of workers in host communities and how can a member of the community file a related complaint at NHPC's office located in Batchenga. NHPC's grievance redress mechanism shall acquire the necessary expertise to handle this type of complaint (see ESAP action no. 12). The communication campaign shall particularly target young women and teenagers to effectively raise their awareness on the risks of HIV/AIDS and unwanted pregnancies, and that most of the migrant workers will return to their place of origin where they most likely have families, once construction has concluded.

Despite the aforementioned measures, influx of migrants in the area is expected. To reduce the impact on Affected Communities, NHPC will implement a number of mitigation measures in coordination with local authorities which are detailed in the Migratory Influx Management Plan. These include: (i) local land use planning for the communes of Batchenga, Ntui and Mbandjock to identify areas of urban expansion to receive migrant populations; (ii) channeling of newcomers to urban areas; (iii) reinforcement of existing control systems (i.e. local police, watchdog village committees); (iv) monitoring of inflationary trends and implementation of food security measures

if required; and (v) improvement of public infrastructure (i.e. seven boreholes in villages and extension of water distribution network in two small cities; construction and operation of six additional classrooms; strengthening of existing and construction of a new public health center). NHPC will also include gender specific mitigation measures within its Migratory Influx Management Plan to ensure negative impacts on women due to the project are addressed (see ESAP action no. 13). NHPC has used a conservative scenario of a population influx of about 1,500 people to budget the required investments in mitigation measures. If population influx is more than the expected scenario, NHPC shall review its Migratory Influx Management Plan in coordination with local authorities and other large infrastructure projects in the area to ensure its adequacy.

Community exposure to disease: The impounding created by dams often results in an increase in water related vector borne diseases such as malaria, schistosomiasis, and filariasis (including onchocerciasis). In addition, the in-migration of workers may result in an increase in sexually transmitted diseases and human immunodeficiency virus (HIV), and an increase in accidents can also be expected as result of the increase in vehicle traffic. A study was commissioned by NHPC in 2015 to understand the epidemiological profile and the condition of the public health infrastructure in the area. Based on the responses of health care personnel, leading causes of morbidity in the area are malaria, typhoid, and HIV/AIDS. In fact, the area is already favorable to the spread of HIV/AIDS and other STDs due to the influx of truck drivers working in the sand mining business. NHPC will conduct an epidemiological survey in the second quarter of 2017 to obtain more precise baseline data on the incidence of diseases in the impacted areas. As part of NHPC's ESMS, health indicators will be defined with local health services, and support will be given to local health services to monitor those indicators throughout the duration of the project (see ESAP action no. 2). This information shall be summarized and reported annually in the Quarterly and Annual E&S Monitoring Report (AMR) to be presented to IFC.

NHPC has contractually required EPC contractors to implement measures to avoid or minimize transmission of communicable diseases that may be associated with the influx of labor, for example, awareness campaigns on the prevention of malaria, onchocerciasis, and HIV/AIDS and other STDs; provision of insecticide-treated mosquito nets to all accommodated workers, provision of working clothes with long sleeves to reduce risk of insect bites, free condoms, and HIV consultations and voluntary screenings. NHPC shall coordinate measures among all EPC contractors and subcontractors to ensure that all workers have access to free HIV/AIDS consultation, screening, retroviral medication and means of protection to avoid the spread of the disease, and coordinate any awareness and communication campaign among sex workers and the population in general (see ESAP action no. 14).

Traffic safety: The transportation of project personnel, material and equipment will substantially increase traffic on the Route Nationale 1 (RN 1). To mitigate the risks of traffic accidents, NHPC

will coordinate with the Ministry of Travaux Publics to ensure the installation of traffic signs and speed bumps in sensitive areas (e.g. markets, schools) and the control of vehicle speed limit by the local police force. As part of NHPC contractual clauses, EPC contractors shall be required to implement transport safety measures. The EPC contractors' transportation management plans shall include: (i) speed limits; (ii) the adoption of limits for trip duration to avoid overtiredness; (iii) the avoidance of dangerous routes and times of the day to reduce the risk of accidents; (iv) specific requirements for vehicular maintenance; (v) specific requirements for drivers' licensing and training; (vi) alcohol tests and awareness campaigns to emphasize safety aspects among drivers; and where feasible (vii) the use of speed control devices (governors) and remote monitoring of driver action. These measures shall apply to all in-house and contracted transportation (see ESAP action no. 15).

Hazardous material management and safety: The GC EPC contractor has developed a detailed management plan to control risks from the storage, use and transportation of hazardous material. NHPC will ensure that control measures are implemented by the GC EPC contractor as planned, and that the EM1 and EM2 EPC contractors finalize and implement a more detailed plan.

Exposure to noise, vibration, dust and light pollution: The villages that will be mostly impacted from construction operations will be Ndji (pop. 849) and Ndokoa (pop. 273), which are located about 1 km away from construction sites. As part of its E&S integrated management system, the GC EPC contractor has defined measures to mitigate the impact of noise, vibration, dust, air pollutants, and light pollution on the nearby villages. NHPC shall ensure that the GC EPC contractor also implements a blasting risk management plan, which shall include a communication strategy with Affected Communities to inform and manage perceptions of the risks of blasting activities. The plan shall also include pre-blast and after-claim property condition surveys to prevent unfounded claims of damage caused by vibration and air overpressure. Property condition surveys shall include also properties along construction access roads in the hydroelectric facility DUP area to prevent unfounded claims of damaged due to vibrations caused by heavy trucks (see ESAP action no. 16).

Dam Safety: According to ICOLD's definition of a "large dam", Nachtigal is a large dam as it will be between 11 and 16 m high and have a total crest length of 2008 m. In March 2015, an independent Panel of Experts (POE) appointed by IFC and the Government of Cameroon performed a review of the project's detailed feasibility study, which included aspects of dam safety (i.e. stability, ability to withstand a 10,000-year flood, and auscultation system). Recommendations provided by the panel were adopted by NHPC. In addition, the WB is designing a technical assistance project for the hydropower development on the Sanaga river, which includes the financing of a Dam Safety POE to supervise the construction of Nachtigal HPP. The WB and IFC will appoint this independent Dam Safety POE four months prior to start construction. Once the final project design is finalized, NHPC will commission a dam break analysis to identify with

certainty downstream infrastructure and people at risk and identify appropriate warning systems and other measures to address flood events, rapid water level rises in case of peaking power production and potential dam failures (see ESAP action no. 17). The dam break analysis is a condition of the concession agreement; NHPC will only receive the exploitation permit under condition of having performed the study. The dam safety measures shall be outlined in the project's dam safety emergency plan and adequate resources shall be budgeted for its implementation and maintenance (see ESAP action no. 18). As part of the dam's operation and maintenance plan, NHPC shall also develop and implement a dam safety surveillance program (see ESAP action no. 19).

Security forces: Access to the construction basecamp will be controlled through the use of cameras, badges and a team of 30 unarmed surveillance and security personnel under the responsibility of the GC EPC contractor. In addition, the Government of Cameroon (GoC) has declared Nachtigal a project of national priority and will station 60 military personnel on site to protect its perimeter and sensitive areas. To confirm the level and types of security arrangements that the project will need, NHPC shall carry out a security risk assessment to identify the likely security threats during construction and operation that would require a response by security personnel, and the potential impact that such response might have on community members. Based on the outcomes of the security risk assessment, NHPC shall develop a security management plan which shall include: (i) the objectives of the plan; (ii) the policies and standards that guide security management; (iii) an overview of the security situation (i.e. security risks and private/public security arrangements); (iv) a description of physical security approach (i.e. barriers, surveillance, control centers); (v) security operating procedures (i.e. access-control, incident response, security patrols, travel security, material storage and control, firearms security); (vi) management structure and responsibility for the control and supervision of security forces; (vii) management of private security forces (i.e. screening, equipment, training); (viii) management of relations with public security forces; (ix) incident reporting and inquiry; (x) community engagement. The security management plan shall be regularly reviewed and revised by competent professionals (see ESAP action no. 20). NHPC shall ensure that companies retained for the provision of security services during construction and operations have a system to ensure effective oversight and accountability of security personnel with respect to key PS 4 requirements (e.g., vetting of personnel, training in the use of force and appropriate conduct, procedures in the event of any incident or alleged violation) (see ESAP action no .21). In addition, NHPC has retained a security officer to engage with the GoC to ensure public security arrangements do not pose a threat to the safety of workers and Affected Communities. The deployment, conduct, training, and incident follow-up of public security personnel shall be discussed with the army in depth and shall be ideally documented via a Memorandum of Understanding or similar, to ensure these are aligned with key PS 4 requirements (see ESAP action no. 22). NHPC's grievance redress mechanism shall work as a confidential channel for concerns or complaints about private and public security personnel by community members (see ESAP action no. 12).

PS 5 – Land Acquisition and Involuntary Resettlement

Resettlement and Livelihood Restoration Measures for physically and economically displaced persons in areas declared as being subject to eminent domain: The development of the project will entail the temporary and permanent loss of land and fishing grounds for populations in the dam impact area, transmission line, and NHPC base camp in Batchenga. Resettlement Action Plans (RAPs) have been prepared for these three areas. A Ministerial decree declaring an area of 1792 ha around the future dam and 247 ha of right of way for the transmission line as subject to eminent domain (compulsory purchase, or DUP using the French acronym) was issued on November 10, 2014. The "Commission de Constat et d'Evaluation" (CCE) was then established by Cameroonian authorities on March 5, 2015 to lead the resettlement process, and a comprehensive assets inventory was conducted from August 2015 to May 2016. The cutoff date for compensation eligibility was established by NHPC as the date the team carried out the assets inventory. The census team was comprised of CCE, a representative of the project developers (NHPC E&S Department) and a consulting firm retained by NHPC to prepare the RAP. No construction activities will take place before the expropriation decree has been issued by the Presidency, and project affected people (PAP) have received their compensation payments.

Dam: Four villages – Ndji, Ndokoa, Minkouma and Bindandjengue – with a total population of 1,470 inhabitants, are directly impacted by the dam. In these villages, individual compensation will be provided to 147 PAP (corresponding to 138 households) whose agricultural plots amounting to 142 ha will be expropriated (22% of the land is cultivated by women). The average agricultural area loss per PAP is one (1) ha. According to self-reported data, PAP own an average of 5.9 ha each and about 40% of this land is forested and kept as reserve. PAP will receive in-cash compensation at market value for lost agricultural crops (i.e. one harvest for annual crops and for perennial crops the number of years replacement plants will take before they enter into production). In addition to cash compensation for lost crops, all PAP will receive compensation for expropriated agricultural land in the form of either land-for-land replacement, or cash compensation.

Land compensation criteria take into account the fallow period needed to maintain soil fertility and accounts for population growth. Each affected hectare of annual crops will be compensated with three (3) hectares of replacement land, and each hectare of perennial plantations will be compensated with 1.5 ha. As a result of awareness campaigns by NHPC E&S team over the last year, 91 out of 147 PAP have opted for land-based compensation. These PAP will also receive an allowance for the clearing of their new plots which amounts to the same area of land they had under cultivation. Most of the PAP that have opted for cash compensation for lost land have stated that they will have enough land to continue their agricultural activities even after losing the expropriated area. At this point, replacement land has been identified in the area for all PAP and

a protocol has been agreed with traditional ("chefs de village" and "chefs de groupement") and governmental authorities (sous-prefects) to ensure that land transfers are recognized under customary law. Replacement agricultural lands are located within a radius of 3-4 km and have been selected by each PAP individually. Vulnerable PAP, i.e. the elderly, single mothers, persons with disabilities, have also been identified to ensure they receive additional assistance to restore their livelihoods as per the mitigation measures detailed in the RAP. Three out of 138 affected households will also lose their dwellings: NHPC will rebuild these dwellings with improved materials and will ensure that the affected households obtain land titles under conventional law.

In addition to the loss of private agricultural lands, affected villages will lose access to non-timber forest products (NTFP) in the DUP. NTFP provide a small source of revenues (3.2% of total annual revenues) but can be an important source for household consumption. A survey was conducted to understand to what extent NTFP will be accessible throughout the construction and operation of the HPP. Mitigation measures will include the propagation of NTFP in private agricultural land, the inventory of NTFP accessible outside the DUP, and the management of an agroforestry area accessible to the affected villagers. These mitigation measures will be implemented as part of the RAP and the Biodiversity Action Plan. In addition, to compensate for the lost access to NTFP, NHPC will provide villages with a limited fixed monetary amount to be invested in health and education infrastructure during construction and the entire duration of the concession.

Fishing will be prohibited in the DUP from the start of construction to reservoir filling, which is estimated to last five years. Once the reservoir is filled, fishing will still not be allowed in the 3.3 km dewatered stretch of the Sanaga river (from the dam to the turbines) and 500 m upstream of the dam for safety reasons. In addition, fishermen will have to adapt to new fishing conditions in the reservoir. Around 117 fishermen and 83 fish traders (mostly women) have been inventoried and recognized by village chiefs in the DUP. NHPC will provide a small cash allowance to these PAP so that they are able to reach fishing grounds upstream and downstream of the DUP during the transition time; fishermen will also receive bicycles for this purpose. Once the reservoir is filled, NHPC will provide support to regulate and prioritize access of these PAP to the resevoir, help them adapt to new fishing conditions, and improve fish processing infrastructure. These livelihood restoration measures are included in the RAP.

Transmission line: The project will entail the construction over a 2-year period of a 50 km high voltage transmission line from Nachtigal HPP to Nyom2, just outside of Yaoundé. The transmission line runs through 25 villages with an estimated population of 22,000 inhabitants. The total area impacted by land use restrictions in the right of way is 247 ha of which 120 ha are cultivated. Individual compensation will be provided to 565 PAP whose agricultural plots will be affected. The average affected agricultural area per PAP is 0.2 ha. According to self-reported data, PAP own an average of 5.8 ha each and about 56% of this land is forested and kept as land reserve. In addition to cash compensation corresponding to the replacement value of lost crops (i.e. one

harvest for annual crops and for perennial crops the number of years replacement plants will take before they enter into production), PAP will receive a one-time payment in order to allow them to continue their agricultural activities during construction in leased land.

As land presently used for trees and shrubs (69 ha), most importantly cocoa, will only allow for low agricultural crops after the transmission line is constructed, a compensation will be provided to allow PAP acquire replacement land. In addition, titled land (37 ha) will be compensated allowing PAP to acquire and title land elsewhere. NHPC will also implement a livelihood restoration program. Among the proposed measures are: (a) support for land preparation; (b) distribution of improved seeds for the first new crops; (c) basic agricultural kits; (d) access to agricultural extension courses and training. As for the DUP-dam, vulnerable PAP have been identified to ensure they receive additional assistance to restore their livelihoods. The route of the transmission line has been designed as to minimize relocations; only three households will have to be relocated. A limited number of public and private infrastructure (i.e., five wells and water sources, shelters, etc.) have been inventoried and will be compensated.

Out of the 247 ha impacted by the right of way, 81 ha are covered by forests. PAP and villagers in general will lose access to NTFP in these areas. Even though NTFP provide a small source of revenues (2.1% of total annual revenues), these can play an important role in household consumption. While individual compensation will be provided for the lost NTFP in and around the agricultural fields and PAP will receive NTFP seedlings as part of the livelihood restoration measures, no individual compensation will be provided for the lost access to NTFP in forested areas. NHPC will provide all villages with a one-time payment at the end of the construction to be invested in health and education infrastructure.

NHPC base camp: During operations NHPC will establish its base camp in the small town of Batchenga located 15 minutes away from the future hydroelectric power plant. NHPC offices have also been installed in Batchenga since 2014. An area of 19 ha has been selected in agreement with the local authorities. Two hundred and seven PAP will be impacted by the loss of agricultural land in the villages of Emana-Batchenga (17 ha, 199 PAP) and Balong I (2 ha, 8 PAP). Impacted infrastructure is limited to a water well; and no physical relocation will be necessary. Compensation payments have been calculated using the same criteria as in the RAP for the dam and transmission line. NHPC has found replacement land (22 ha) less than 4 km away to compensate affected families and a committee with representatives of the affected families and local traditional authorities was been set up to ensure the replacement land had the following characteristics: proximity, similar agricultural potential, and absence of contestations.

To date (i.e. as of mid-March 2017), 51 information and consultation meetings with more than 1700 participants (i.e. PAP, local authorities) have been organized by NHPC E&S team to present the assets inventory, and the eligibility and compensation matrix. Each PAP has been presented a

census form for his/her approval detailing the agricultural crops to be compensated; the forms are signed by the PAP, CCE, NHPC, and the village chief. In addition, PAP are also informed of the additional monetary compensation for loss of access to natural resources and the livelihood restoration measures included in the RAPs. Stakeholders have been informed about NHPC's grievance mechanism, which has been in place since April 2015 and has already resolved multiple complaints related to the assets inventory.

Compensation payments are expected to take place in the second quarter of 2017 for the dam, and last quarter of 2017 for the transmission line and NHPC's base camp in Batchenga. NHPC has also retained a local NGO to meet with each impacted household (both spouses to be present) to explain the compensation payment amount they will receive and discuss best options to use the money to ensure they restore their income generating activities. Money will not be paid in cash but through transfers to local microfinance institutions and to a bank in Yaounde for larger amounts, which will offer to open accounts free of charge. Construction works will only start after compensation payments have taken place.

The RAPs for all affected areas have been prepared by a qualified consulting firm in close collaboration with NHPC E&S team. The RAPs are in line with the requirements of IFC Performance Standard 5. The consulting firm also collected socio-economic information for each group of PAP (i.e. farmers, fishermen, fish traders) to estimate their sources of revenues and calculate a quality-of-life index to be monitored throughout the project's life. Implementation of livelihood restoration measures will be closely monitored by NHPC E&S team and socio-economic data will be collected annually by the consulting firm through statistically sound sampling methodologies until the third year after the filling of the reservoir. If data show a deterioration on the quality of life of PAP – farmers, fishermen, or fishtraders – NHPC will provide additional resources to mitigate negative impacts and allow for the restoration of livelihoods.

Livelihood Restoration Measures for sand miners: Sand mining along the Sanaga river is actively practiced due to demand for construction materials from Yaoundé where a 20 ton truck load of sand can be sold for 100 to 200 EUR. The activity is regulated by the Ministry of Mines which issues annual extraction permits. Most of the permit holders are local elites who have the financial resources to obtain the permits and invest in access roads. Sand mining in the area is not mechanized and is a strenuous and hazardous activity. Workers dive down several meters to gather sand from the river bottom with buckets and stockpile it on canoes; fatalities are not uncommon. Sand mining started in the area in the 1980's and extraction has increased progressively to match the sand contributions from the river. A study commissioned in 2014 evidences the disappearance of sand banks along multiple sites of the Sanaga river and roughly estimates around 600,000 m^3 the annual amount of sand extracted from the Sanaga river until the confluence with the Mbam. However, sand miners in the last couple of years have already noticed a decrease in the availability of sand after the completion of Lom Pangar's reservoir located upstream.

Nachtigal's reservoir will result in changes in flow limiting the availability of sand downstream of the dam. The 2011 ESIA indicates the area to be impacted stretches from Nachtigal's reservoir to the confluence of the Sanaga and Mbam rivers, about 50 km downstream the reservoir. It is estimated that sand mining provides around 900 direct jobs in the impacted area and an undefined number of indirect jobs (i.e. manufacturing of canoes, food catering, lodging, and transportation). Districts and villages also benefit from a percentage of the "extraction tax". NHPC E&S team with support of a qualified consulting firm conducted surveys in March 2015, July 2015 and January-February 2016 to inventory people engaged in the sand mining value chain. NHPC identified 51 quarry owners (persons who have extraction permits) but the identification of workers is still uncertain as the number declared by quarry owners is largely higher than the workers identified during the surveys. This can be explained by the fact that sand mining is a seasonal activity and there is high mobility of workers between quarries. To better account for people eligible for compensation, NHPC carried out an additional survey campaign from October 2016 to March 2017. NHPC E&S team visited every sand quarry site for multiple days to ensure they accounted for all workers. The list of sand miners will then be verified in Q2 2017 by validation committees which include local authorities and village representatives, which will also evaluate claims of PAP that have not been accounted in the surveys. The validation committee will also verify the compensation eligibility of canoe manufacturers and food caterers. Consultations were carried out in April 2015, July 2015 and January 2016 to present the results of the first survey campaign and identify compensation options. Consultations were organized with different focus groups (e.g. quarry owners, workers, food caterers, etc.) to ensure meetings did not get controlled by most influential groups. In the meetings most PAP have expressed their preference of monetary compensation.

Of the 51 identified sand quarries, 20 are located in the project DUP and are therefore directly impacted by permanent restriction on physical access to the sand resource due to project land acquisition. The remaining 31 quarry sites downstream of the DUP will not be directly affected by land acquisition-related restrictions on access to their sand mining operations – i.e. the river segments which they mine will not be acquired or developed by the project – but will be nevertheless impacted by the decreasing availability of sand: sediments accumulating at the tail of the reservoir will not be flushed but will be extracted by an authorized mechanized operator. While the provisions of PS 5 apply only to the 20 quarry sites located in the DUP, the project recognizes that people owning and/or working at all 51 sites will be economically displaced, albeit to varying degrees. To avoid potential conflicts between sand miners, the project has developed a single livelihood restoration plan that will provide the same level of compensation and support for alternative livelihood options to all the identified PAP without distinguishing where the quarry site is located.

NHPC has estimated the annual income for direct (i.e. quarry owners, managers, workers) and indirect PAP (i.e. canoe manufacturers, food caterers) and developed an eligibility compensation matrix. Direct PAP will receive cash-payments corresponding to annual loss of revenues, estimated at six (6) months of revenues, and indirect PAP will receive payments estimated at three (3) months of revenue. Quarry owners will also receive 70% of the investments made in the last 15 years to obtain the permits and prepare access routes and riverbanks. NHPC will also provide a travel allowance for migrant workers. As is the case for PAP affected by land expropriation, those PAP whose sand mining activities are impacted will have preferential access to low skill jobs during construction works, and will benefit from livelihood restoration initiatives for which NHPC will sign agreements with local implementation partners. Final consultations regarding the compensation matrix proposed by NHPC will be carried out once the validation committees have verified the list of beneficiaries. This is expected to happen in the second or third quarter of 2017. NHPC shall document and report to IFC the consultation process on the compensation matrix and final agreements with PAP (see ESAP action no. 23).

With the construction of the dam, sand will accumulate at the tail of the reservoir. An authorized operator for sand exploitation in the reservoir shall be selected by the Government of Cameroon, NHPC participating in the definition of operating conditions. Quarry owners impacted by the dam have expressed their expectation to be prioritized in this operation. However, as the extraction of sand from the reservoir will require sophisticated machinery, it is unlikely that the quarry owners in the area will be awarded the contract. Information on the contractual requirements shall be widely disseminated to avoid erroneous expectations. To compensate for lost revenues from the "extraction tax" paid to districts and villages, it is proposed to include as part of the contract clauses that 1% of revenues from sand extraction be paid into a community compensation fund to be allocated among the districts that will lose the revenues from the sand mining "extraction tax". This is yet to be agreed to by the relevant Government agencies.

The same consulting firm monitoring socio-economic indicators for PAP affected by land expropriation will monitor this group of PAP. If data show a deterioration on the quality of life of sandminers who remain in the project area, NHPC will provide additional resources to mitigate negative impacts and allow for the promotion of alternative livelihood options.

Three years after commissioning of Nachtigal HPP, NHPC will conduct an independent Resettlement and Livelihood Restoration Completion audit for all physically and economically displaced PAP demonstrating compliance with IFC PS5, or if necessary, identifying any remaining gaps and corresponding corrective actions with budget and timeline for implementation (ESAP action nr. 24).

PS 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources

Context

The Nachtigal Hydropower Project is located on the Sanaga River in Cameroon within the Northern Congolian Forest Savanna Mosaic ecoregion and Africa Freshwater ecoregion, as these regions are defined by WWF. The project is not located in any of Conservation International's Biodiversity Hotspot or High Biodiversity Wilderness Area, or within an Endemic Bird Area. There are no Protected Areas or Internationally recognized areas for biodiversity within or near the project area, either upstream or downstream. The area consists of humid semi-deciduous forest and savanna, with many areas of savanna and forest mosaic. Much of the forest areas have evidence of human intervention or consist of secondary forest. No invasive alien species were noted in the project area, except for water hyacinth, which is a common risk in hydropower reservoirs. This risk is addressed under PS3.

Several Ecosystem Services were identified within the project area, including fishing, sand mining, traditional medicines, wood collection, bushmeat hunting, and freshwater. Mitigation actions to address project impacts on these ecosystem services are outlined in the Biodiversity Action Plan (BAP) through community conservation actions (COPAL, see more details below under Terrestrial Fauna and Flora) and are also addressed under PS5.

In January 2016, the flow rate of the Sanaga River was significantly altered by the commencement of operation of the Lom Pangar regulation reservoir located about 250 km upstream of Nachtigal HPP. The Sanaga's flow rate has been changed to an average minimum flow of 650 m^3/s, which is much higher than the minimum natural flow rates on the Sanaga which were often below 300 m^3/s. Due to the likely impacts of this change on aquatic biodiversity communities, the aquatic habitat within the project area is classified as Modified Habitat.

Terrestrial Habitat, Fauna and Flora

Terrestrial Habitats within the project area consist of humid semi-deciduous forest and savanna ecosystems. Terrestrial Habitats in the DUPs were classified as 1119 ha Natural Habitat and 262 ha Modified Habitat (per PS6). Much of the forest areas have evidence of human intervention or consist of secondary forest. The project will impact 675 ha of Natural Habitat including 524 ha of forest and 151 ha of savanna. No terrestrial biodiversity values qualify as Critical Habitat.

As a complementary study to the ESIA, the project commissioned an inventory of the flora and fauna in 2014 to determine if endangered, endemic or migratory species are present in the project area of influence. The inventory identified several priority biodiversity values (but none that trigger Critical Habitat) including giant pangolin (*Smutsia gigantean* – VU), common pangolin

(*Phataginus tricuspis* – VU), hippopotamus (*Hippopotamus amphibious* – VU), dwarf crocodile (*Ostealeamus tetracus* – VU), Bannerman's turaco (*Tauraco bannermani* – EN), Martial Eagle (*Polemaetus bellicosus* – VU), and the terrestrial plant *Hymenodictyon pachyantha* – EN (Cameroon IUCN Red List Assessment). No migratory species were identified in the area.

The project developed an ESMP and a Biodiversity Action Plan (BAP) to outline mitigation measures to avoid and minimize predicted negative impacts on terrestrial biodiversity, and to deliver No Net Loss where feasible for terrestrial Natural Habitat and its terrestrial biodiversity values. Mitigation actions include a biodiversity offset where NHPC will provide financial support to the Mpem et Djim National Park (80 km North from the project site) and the community forest Coopérative des Paysans de la Lekié (COPAL) (20 km East from the project site) during construction and the 35-year operation concession. These sites were selected after consultation with national and local stakeholders, including government agencies (MINFOF-Direction de la Faune et des Aires Protégées, MINEPDED-Service Biodiversité, Director of Mpem et Djim National Park), NGOs (WWF, UICN), international cooperation organizations (CIRAD, CIFOR, GIZ), and local communities (COPAL). NHPC will provide support to the Mpem et Djim National Park for anti-poaching activities, control of illegal logging, and restoration of 100 ha of forest degraded by illegal logging activities. Additionally, the following management activities are proposed for enhanced protection and restoration of biodiversity values in COPAL: (i) protection of a core of 250 ha inside a non-degraded 1150 ha of forests initially intended to be logged; (ii) protection of 250 ha of riparian vegetation; (iii) creation of 200 ha of agroforestry plantations acting as buffer zones around the two protected areas; and (iv) enrichment plantations in 1,100 ha. To ensure the effectiveness of the BAP, NHPC has engaged qualified experts to (i) detail the activities to be implemented in the Mpem et Djim National Park and COPAL; (ii) define the biodiversity monitoring and evaluation plan; (iii) monitor forest cover in the project area of influence, the Mpem et Djim National Park and COPAL during the project life.

Aquatic Habitat, Fauna and Flora

Aquatic Habitat within the study area (upstream and downstream) covers 663 ha. The river is classified as Modified Habitat due to the extreme changes in minimum flow rate resulting from operation of the Lom Pangar regulation reservoir upstream of the project (see more on this below under Aquatic Plants). The construction of the dam will i) transform 264 ha of free flowing river (lotic ecosystem) into a slow flowing reservoir habitat (lentic ecosystem), ii) dewater 198 ha of river in the right bank reaches downstream of the dam (which will receive water only between September and November when the river flow is above Nachtigal HPP's design flow of 980 m^3/s), and iii) reduce the flow rate in 179 ha of river in the left bank reaches downstream of the dam (EFlow from 25 to 47 m^3/s). The presence of a 15 m high weir will also block fish movement between downstream and upstream of the project.

Dams hold back sediments resulting in the erosion of the downstream riverbed and riverbanks many kilometers below the dam, which may result in the loss of important habitat for fish species to complete their life histories. Nevertheless, a complementary study to the ESIA conducted by Artelia in 2014, determined that sand mining activities in the area have already depleted sand stocks and the area is already degraded in terms of sand availability for the maintenance of fish and invertebrate habitats.

Fish

An ichthyologic study to identify fish species composition and abundance was performed from January to October 2014. Monthly semi-quantitative fish catches were performed at 12 stations along the Sanaga river, and one-time catches were performed at 9 stations along the Sanaga's tributaries. The taxonomic inventory identified 65 fish species and the bibliographic research identified an additional 21 species as potentially present in the area. Out of the 86 species, 13 are endemic to the Sanaga river and among them three are endangered or vulnerable. Discrete Management Units (DMU) for these 13 fish species were established corresponding to approximately 20% of the Sanaga watershed. Based on the presence and abundance of the species in the DMU, the project has determined (and IFC concurs) the DMU as Critical Habitat (CH) for the following 9 fish species: (i) *Labeobarbus mbami* – EN, (ii) *Chrysichthys longidorsalis* – VU, (iii) *Marcusenius sanagaensis* – VU, (iv) *Doumea sanaga* – LC, (v) *Labeo nunensis* – LC, (vi) *Labeo sanagaensis* – LC, (vii) *Synodontis rebeli* – LC, (viii) *Campylomormyrus phantasticus* – LC, and (ix) *Petrocephalus similis* – LC.

No anadromous (migrate from the sea up into freshwater to spawn) or catadromous (migrate from freshwater down into the sea to spawn) fish have been identified. On the other hand, potamodromous species (migrate laterally or longitudinally along the river) are numerous. Among the CH species there is the suggestion that *Labeobarbus mbami* – EN migrates from the Sanaga to the tributaries to spawn in flooded forests. Other CH fish with potamodromous migratory behavior are *Synodontis rebeli* – LC (adults migrate to tributaries to spawn), *Marcusenius sanagaensis* – VU (adults search breeding areas in lotic environments), and potentially *Chrysichthys longidorsalis* – VU.

To mitigate the project's construction impacts on aquatic habitat and fish, NHPC will (i) avoid the degradation of fish habitat through the prevention of sediment input and untreated effluents into the Sanaga river during construction; and (ii) minimize fish mortality during construction through fish rescue from dewatered river sections. To mitigate for the operation impacts on aquatic habitat and fish, the project will implement the following mitigation measures: (i) maintenance of an environmental flow (EFlow) between 25 and 47 m^3/s in the left bank (179 ha of aquatic habitat) of the dewatered river reach downstream of the dam; (ii) restoration of 156 km of Sanaga tributaries (corresponding to approximately 203 ha of aquatic habitat); (iii) enhancement of 395

km of river reaches inside the Mpem et Djim National Park (corresponding to 408 ha of aquatic habitat); and (iv) implementation of an awareness program to reduce the use of ichthyotoxic products for fishing inside the Mpem et Djim National Park. NHPC will engage partners with adequate expertise for the implementation of these measures.

A feasibility analysis for the construction of a fish passage at the dam concluded that a fish ladder would be a challenge due to the high number of fish species with varying migratory inclinations and abilities. In addition, the waterfalls of Nachtigal located just downstream from the proposed dam are already a natural barrier for upstream migration of most species. The report concludes that the optimal mitigation action to maintain the genetic mixing of the various species is a catch-and-release program. International experts have been retained by NHPC to test the use of electrofishing and develop a fish catch-and-release program. NHPC shall provide the results of the experimental electrofishing, details of the proposed catch-and-release program, and assess program effectiveness and efficiency to achieve long term genetic mixing of fish stocks upstream and downstream of the proposed dam (see ESAP action no. 25). Additionally, NHPC shall appoint an independent fish and biodiversity expert for at least 3 years to evaluate if the catch-and-release program is sufficient to maintain the genetic diversity of the fish populations and maintain the migratory fish populations. The independent fish expert shall also provide ongoing advice on the Biodiversity Action Plan for Fish (BAP-Fish) and monitoring of Net Gain for CH fish species. (ESAP action no. 26). If the catch-and-release program is deemed to be insufficient, NHPC will design and build a fish passage before commissioning of the dam.

The mitigation measures described above will be implemented to achieve Net Gain for the 9 CH fish species. These measures are described more fully in the BAP-Fish that has been disclosed together with this ESRS.

The BAP-Fish includes detailed studies to develop a robust monitoring program to monitor the impacts of Nachtigal HPP on the 9 CH fish species and the effectiveness of mitigation and habitat restoration measures. The monitoring program includes indicators of fish species composition and abundance and fish habitat quality. Results of the analysis of these data will be used to quantify net gain for the 9 CH fish species. Data collection will commence before construction of the dam and will extend throughout the 35-year operation concession. The monitoring program will include an updated biophysical baseline (dry and wet season) to (i) differentiate the impacts of Nachtigal HPP from the impacts of Lom Pangar HPP which started operating in 2016 (see ESAP action no. 27); and (ii) determine the presence and abundance of CH fish species in the Mpem et Djim National Park and targeted tributaries. In addition to the BAP-Fish, NHPC will provide financial support to the Ministry in charge of fisheries to control the access of local fishermen to the reservoir.

Aquatic Flora

The 2014 inventories of flora and fauna also revealed the presence of three aquatic plant species that are listed on the Cameroon IUCN Red List: *Marsdenia abyssinica* – Critically Endangered (CR), *Ledermanniella sanagaensis* – CR, and *Ledermanniella thalloidea* – Endangered (EN). In addition to their endangered status, both *Ledermanniella* species are endemic to Cameroon. The DMU for two of the aquatic plant species has been determined as Critical Habitat: (i) *Ledermanniella sanagaensis* – CR, and (iii) *Ledermanniella thalloidea* – EN. Particularly important is the occurrence of *Ledermanniella sanagaensis*, whose distribution is restricted to the project area based on current evidence (Tier 1 Critical Habitat).

To better understand and mitigate impacts on the two Critical Habitat aquatic plant species, NHPC has retained local and international plant experts to conduct a detailed inventory and design the mitigation measures. *Ledermanniella* is a genus of flowering plants in the family Podostemaceae; there are at least 44 species, all native to tropical Africa. *Ledermanniella* is an aquatic plant that requires a period of emersion for its reproductive cycle. Emersion of the *Ledermanniella* in the project area used to occur between the months of January and April when the flow of the Sanaga river was below 375 m^3/s (before flow regulation by Lom Pangar).

The project commissioned studies by a local plant expert to inventory the stations (sites) of *Ledermanniella* in the area impacted by the project and study its phenology in 2015 (Pre-Lom Pangar HPP operation), and then in 2016 and 2017 (Post-Lom Pangar HPP operation). In 2015, the inventory documented 35 stations of *Ledermanniella* (both species) within the project area. In January 2016, the Lom Pangar regulation reservoir located upstream from Nachtigal started partial commissioning. Between January and April 2016 Lom Pangar released an average minimum flow of 450 m^3/s, and the flow was below 375 m^3/s only during two weeks. Field surveys conducted from February to March 2016 were able to locate only five (5) *Ledermanniella* stations, all the others being submerged. As Lom Pangar is now fully operational, releasing a minimum flow of 650 m^3/s, the last field survey conducted in January 2017 was not able to locate any of the previously identified *Ledermanniella* stations.

Operation of Nachtigal HPP will modify the flow rate in a way that will benefit the *Ledermanniella* species. Nachtigal HPP will be able to replicate the alternation of periods of immersion and emersion in the dewatered section of the river below the weir, which may allow the *Ledermanniella* to complete its reproductive cycle again. This is predicted by experts to allow the survival of 12 *Ledermanniella* stations located on the left bank of the dewatered section that will receive an EFlow of 25-47 m^3/s, as long as the *Ledermanniella* is able to survive four to five years of total submersion. Other mitigation measures to be implemented by the project include the transplant of *Ledermanniella* stations located in the right bank of the dewatered section that will not receive the

EFlow (or from the Mbam river in case Sanaga stations disappear) to the left bank of the dewatered stretch or tributaries of the Sanaga with adequate conditions.

While the feasibility of Nachtigal is dependent on Lom Pangar, this reservoir serves not only Nachtigal but two existing and six additional planned HPPs. Therefore, as the changes in the quantity and timing of downstream water flow, and the consequent modification of the *Ledermanniella* habitat, were not caused by NHPC or by the GoC in anticipation of this specific project, Lom Pangar is not considered an associated facility under IFC PS 1. Thus NHPC is required to achieve Net Gain with regards to the number of *Ledermanniella* stations that still emerge despite the flow regulation effect by Lom Pangar. IFC and NHPC have agreed that the project shall achieve Net Gain with respect to the stations identified in the 2017 field surveys. IFC considers therefore that the proposed mitigation measures described above are adequate to achieve Net Gain with regards to the loss of Critical Habitat for *Ledermanniella sanagaensis* and *Ledermanniella thalloidea*. Additional mitigation measures will also include the collection and conservation of seeds in Cameroon at the National Herbarium and at the Botanical Conservatory in Brest, France. NHPC has identified international experts to act as advisors to increase the likelihood of success of all mitigation measures. Mitigation measures and the monitoring plan are described more fully in the Biodiversity Action Plan for *Ledermanniella* (BAP-*Ledermanniella)* that has been disclosed together with this ESRS. The BAP-*Ledermanniella* shall be regularly adapted based on the monitoring results.

PS 8 – Cultural Heritage

NHPC hired the Institut de recherche pour le développement (IRD) to carry out in early 2016 archeological investigations in the project footprint. Archeological artifacts were found in four (4) soil samples and field inspections found ten archeological sites, half of which were assigned high priority, and seven archeological sites, including one of high priority, in NHPC base camp and transmission line respectively; in addition, field inspections along access roads bordering the headrace canal discovered 24 archeological sites, 14 of which were assigned a high priority. The results of the investigations indicate that the project's area of influence has been inhabited since the Ancient Iron Age. As part of the study, IRD developed a management plan for cultural heritage to be implemented by NHPC. Key activities included in the plan are (i) protection of archeological sites of high priority (ii) preliminary inspections of the area that will be inundated by the reservoir; (iii) awareness training of EPC contractors; (iv) monitoring of earthworks; (v) preliminary analysis of archeological artifacts in laboratories; (vi) capacity building of local institutions; (vii) bi-monthly and final reports and publication of results in scientific journals. Additionally, NHPC will regularly monitor the number of chance finds and archeological artifacts discovered during the construction phase.

NHPC will hire an expert in archeology before earthworks commence who will be stationed on site and will be responsible for the implementation of the plan. EPC contractors are contractually required to develop a chance find procedure as part of their integrated management system and to communicate to NHPC at least 15 days in advance the perimeter of each new area to be stripped so as to allow NHPC evaluate the risk of chance finds. The international expert retained by NHPC will review the adequacy of the chance find procedure and monitor its implementation by contractors. A certain number of sacred sites and trees were identified during the household surveys conducted for the ESIA. A sacred site was identified in the village of Bindandjengue, in the stretch of the Sanaga river that will be dewatered. The assets inventory conducted in 2015-2016 for the preparation of the dam Resettlement Action Plan (RAP) confirmed the presence of these sacred sites and rituals for the relocation of their ancestors to another site have been agreed with the village. Other sacred sites identified during the 2011 ESIA have not been confirmed by the population or are outside of the affected area.

Stakeholder Engagement:

Stakeholder mapping / analysis: NHPC has identified all project stakeholders and in particular those that are key to the successful implementation of the land compensation process and livelihood restoration initiatives. Among them are primarily (i) project affected people (PAP); (ii) authorities of administrative subdivisions (governor, departmental prefects, and district sous-prefects); (iii) decentralized local authorities (majors); (iv) traditional authorities (village chiefs); (v) regional offices of several Ministries (e.g. agriculture, mines, defense, education); (vi) community based organizations (e.g. farmers groups, sand miners cooperatives); (vii) civil society organizations (e.g. human rights, environment, health, etc.); and (viii) local and international NGOs. Identified stakeholders have been mapped based on their level of **importance** and their capacity to **influence** the project.

Stakeholder Engagement Plan: Once stakeholders were mapped, a detailed stakeholder engagement plan (SEP) was developed by NHPC. The duration of the SEP extends from the development of action plans for the mitigation of the project's social impacts (i.e. resettlement action plan, livelihood restoration plan, migratory influx plan, local development plan) throughout their implementation. Implementation of these mitigation plans is expected to conclude before or at the end of the construction period. The SEP indicates the objective of each meeting, the stakeholders to encounter, who is responsible in NHPC to organize the meeting, and expected dates. The SEP is regularly reviewed by NHPC's E&S team.

Information Disclosure: A first series of dissemination of information workshops were held in 2006 (1294 participants) and 2011 (452 participants) to present the results of the ESIA and record main expectations and concerns of stakeholders. Public hearings took place once more in January

2014, where more than 1,000 questions were and remarks were recorded from the public. These dissemination workshops took place in the towns of Ntui, Ndjoré, Batchenga, Obala, Yaoundé 1er–Nlongkak and Nkolondom III, which correspond to the areas that will be mostly impacted by the dam and transmission line eminent domains. The main expectations expressed during these dissemination workshops were the recruitment of local workers, improvements in village electrification, improvement of social infrastructure (i.e. schools, health centers, access to water, roads, etc.), be selected as suppliers of sand for the construction site, and transparency in the expropriation process. The main concerns were related to compensation rates, negative health effects of the dam and the transmission line, impact of migrant influx, and impacts of the dam on sand mining and fishing activities.

Consultation: Since the installation of NHPC's E&S team in Batchenga in April 2014, the team initiated a dialogue with identified stakeholders. During August and September 2014, the team held consultation meetings with the Sous-Prefects, mayors and chiefs of the villages that will be directly impacted by the project (i.e. eminent domain for dam and transmission line). The participation of local authorities is very important as they play a fundamental role in the implementation of local development programs and the resolution of local conflicts and land disputes. During October-November 2014, the team met with governmental programs, research institutes, NGOs, civil society and community based organizations to identify those groups on which NHPC may rely for the implementation of livelihood restoration and other mitigation measures. Multiple information and consultation meetings have been held during 2015 and 2016 in the context of the Resettlement Action Plans, the Livelihood Restoration Plan for sand miners, and the Local Economic Development Action Plan. In total, 51 information and consultation meetings with more than 1700 participants have been held in the context of the Resettlement Action Plans, 38 meetings with above 1100 participants in the context of the sand miners Livelihood Restoration Plan for sand miners, and 21 meetings with 340 participants in the context of the Local Economic Development Action Plan.

External Communications and Grievance Mechanisms: The project grievance mechanism is contained in the Stakeholder Engagement Plan. Stakeholders can present grievances verbally or in writing to NHPC's Grievance Officer stationed in NHPC offices in Batchenga. After NHPC has conducted its investigation, a resolution is proposed to the complainant. If the complainant is not satisfied with the resolution, the grievance can be raised to an independent Mediation Committee. If the complainant does not agree with the decision of the Mediation Committee, he/she can present a grievance appeal to the Appeal Committee which is the last level of appeal. During 2014, 75 information meetings with more than 1,200 participants were held to present NHPC's grievance resolution mechanism, and community meetings were held in eight villages to choose Mediation Committees' members. Four workshops have been carried out to train members of the Mediation Committees on their roles and responsibilities. Twelve consultation meetings with 82 participants were also held with local administrative authorities (Sous-prefects, Majors) on the functioning of

the grievance mechanism, as they will act as members of the Appeal Committee when required. Reception of grievances started in April 2015. From April 2015 to November 2016, 354 grievances have been recorded and 351 have been resolved. Resolution has required 497 individual interviews, 190 field investigations, and five sessions of Mediation Committees. Currently, most of the grievances have been related to the land compensation process. NHPC's grievance mechanism will be operational for the duration of the project's construction and during the 35-year operational concession period. NHPC will regularly review and adapt its grievance resolution mechanism to effectively respond to the changing nature of registered complaints.

Ongoing Reporting to Affected Communities:

The Stakeholder Engagement Plan will be updated and continued during the construction phase, and information will be given to affected communities regarding local labor, grievances redressed, training participation, communities' compensation actions.

Broad Community Support:

BCS – Not Applicable
BCS – Assessed
BCS – In Progress

Environmental and Social Action Plan:

Local Access of Project Documentation:

Contact Person:
Company Name:
Address:
Email:
Phone:
Facsimile: