

# Cambambe Dam Project Phase 2 Environmental and Social Due Diligence Final

Report Prepared for

HSBC Bank plc **HSBC** 

Report Number 452197/2



Report Prepared by

 **srk** consulting

March 2013

# **Cambambe Dam Project Phase 2 Environmental and Social Due Diligence Final**

## **HSBC Bank plc**

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**March 2013**

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# Executive Summary

## Introduction

The Project and Export Finance Division of HSBC Bank plc (“HSBC”) has been appointed by the Ministry of Finance of the Republic of Angola to arrange the financing for the Phase 2 of the Cambambe Dam Project (the “Project”) being implemented by Empresa Nacional de Electricidade (ENE) with the construction works being performed by Odebrecht.

HSBC has approached the Multilateral Investment Guarantee Agency (“MIGA”), Euler Hermes (the German Export Credit Agency), CESCE (the Spanish Export Credit Agency) and a number of commercial banks (together referred to as the “Lenders Group”) to assist in the financing of the Project.

SRK Consulting (South Africa) Pty Ltd (“SRK”) was appointed as the Independent Environmental and Social Consultant (the “Environmental Consultant”) to undertake the pre-financial close Environmental and Social Due Diligence (ESDD) to provide an environmental and social review/appraisal to support the proposed financing. The ESDD was conducted according to the Lenders Group standards. Compliance was assessed in terms of the International Finance Corporation (IFC) Performance Standards (PS) (2012), World Bank (WB) Safeguard Policy (WB SP) Safety of Dams (OP 4.37, 2001), Core Values and Strategic Priorities of the World Commission on Dams (WCD) (2000), the Equator Principles (EP) and Angolan legislation.

## Governance Framework for the Project

### Angolan Legal Requirements

The most critical Angolan legislative requirement pertaining to certain proposed projects is that a comprehensive Environmental Impact Assessment (EIA) process for the project is undertaken. Typically this requires the compilation of an Environmental Impact Statement (EIS), incorporating environmental management measures, which are subject to comprehensive review by the authorities.

### International Standards

The IFC PS’s on Environmental and Social Sustainability are recognised as being the most comprehensive standards available to international finance institutions working within the private sector. The principles provide a framework for an accepted international approach to the management of social and environmental issues. The World Bank Environmental Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC’s PS 3 on Resource Efficiency and Pollution Prevention. The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC.

The WCD, a global multi-stakeholder body initiated by the World Bank and the World Conservation Union (IUCN), have established comprehensive guidelines for dam building that are intended to protect dam-affected people and the environment, and ensure that the benefits from dams are more equitably distributed.

The WB Operational Policies (OPs) have been identified by WB as being particularly important in ensuring that Bank operations do no harm to people and the environment. There are 10 safeguard policies (WB SPs), comprising the Bank’s policy on EIA and policies.

## Project Background

The Cambambe Hydroelectric Facility is one of two hydroelectric power stations currently in operation on the Kwanza River, 180 km southeast of Luanda, Angola. The Cambambe plant was built in 1964 and consists of a 102 m high dam with an open crest-of-the-dam spillway, and an underground power house with four turbine generators rated at 45 Megawatt (MW) each, of which only two are currently in operation.

The Government of Angola, through the Ministry of Energy and Water and ENE, the state-owned power utility, has embarked on a capacity expansion programme. The Cambambe Dam rehabilitation and expansion project forms an integral part of this programme and will comprise three phases:

- Phase 1: Rehabilitation of the four existing turbine generators that are currently not operational;
- Phase 2: Construction of a second powerhouse with four additional turbine generators, with an initial capacity of 175 MW each, or 700 MW in total. The turbines will be housed in an open powerhouse and the civil works part of this phase have already commenced; and
- Phase 3: Heightening of the dam crest elevation by 30 m to the total height of 132 m and the construction of a lateral spillway.

The total annual energy output of the two powerhouses will be 4 914 GWh distributed into the Angolan Electricity Transmission System via a new 400 kV substation. The new substation will also be connected to the existing substation by a 220 kV line.

Once the height of the dam wall has been raised to 132 m, the surface area of the reservoir will be 5.5 km<sup>2</sup> with a “useful” capacity of 45.9 Hm<sup>3</sup>. As a result of the increased dam wall height, a 4 km stretch of the Dondo-Huambo road will need to be relocated and a new bridge will be required to replace the existing Kiamafulo Bridge which will be inundated.

Support infrastructure for the proposed development includes offices, lodging facilities, work yards, workshops, warehouses, laboratory and a gas station. Source material will be obtained from a quarry located downstream of the dam, if sufficient material is not available from other on-site excavations.

Assessment of the realigned road and new bridge, as well as transmission infrastructure is excluded from the scope of the ESDD.

## Environmental and Social Setting

The Cambambe Hydroelectric Project is located on the border of the North Kwanza and South Kwanza provinces on the middle stretch of the Kwanza River, 11 km south-east of the city of Dondo and 180 km south-east of Luanda. There are several villages in the area, many without schools, public health units, water supply systems and sewage systems. Villagers use the Kwanza River for their water supply. Key economic sectors in the area include agriculture, animal husbandry, hunting, fishing, charcoal burning and some trade. Malaria and waterborne diseases and infections are common in the area. The Tsetse fly is endemic to the area and there is a special analysis laboratory and treatment centre in Dondo. Communities that will be directly affected by the Project include the village of Vila de Cambambe (2 595 inhabitants), the military de-mining camp (50 inhabitants) and the police station. Ten military dwellings/buildings will be directly affected by the inundation. The river beach, used by residents of Dondo, Alto Dondo and Vila de Cambambe for recreational purposes, drawing water, fishing and for the loading of charcoal onto boats for transport, will be inundated.

The area is dominated by fluvial erosive processes creating formations such as ridges, hills and mountains. The catchment area of the mid-Kwanza is one of the four sub-basins in the catchment area of the Kwanza River. Between Pungo Andongo and Cambambe, the Kwanza River drops

sharply in elevation, with various rapids and waterfalls (cascades). The average annual flow of the Kwanza River is approximately 540 m<sup>3</sup>/s with the maximum flow occurring between March and April. The reach of the Cambambe Dam extends approximately 6 km upstream. Deposition of sediments in Cambambe Dam has reduced the storage capacity from 24 million m<sup>3</sup> to 19 million m<sup>3</sup>. Water quality is compliant with World Health Organisation (WHO) standards except for significant levels of bacterial contamination associated with anthropogenic activities and /or discharges on or near the river. High metal concentrations occur on the river beaches, with both cadmium and mercury concentrations above permitted levels. High iron concentrations are likely caused by the dissolution of rocks with high iron content.

The vegetation of the Cambambe region comprises Dry Forest Mosaic, predominantly deciduous, and low altitude Dry Savannah. Various species of trees, shrubs and herbaceous species grow profusely in the area making it rich and diversified in taxa occupying different habitats. High fish species diversity was identified in the area although there is a general lack of knowledge with regards to the biodiversity of the Kwanza River basin. Two bird species, identified in the area are on the IUCN's Red List – the peregrine falcon and the golden-backed bishop. No rare or threatened mammal species were observed.

## **Status of Compliance**

### **Host Country**

An ESIA was prepared by Holisticos in order to fulfil a number of Angolan environmental regulatory requirements. The Draft ESIA, dated December 2010 was revised and finalised in December 2012 following a public hearing. A number of relatively major changes to the project, notably placing of surplus material (rock) in the Kwanza River (to create a platform for a new access road) and relocation of the surplus materials dump, are neither described nor assessed in the ESIA. MinAmb awarded an Environmental Licence to ENE-EP on 26 April 2011. Since the Project was approved by the MinAmb and associated fees have been paid in full, the project is deemed to be in compliance with host country requirements for EIA, for the Project as described in ESIA documentation. The Environmental Licence and ESIA lists a number of conditions with which ENE-EP is expected to comply in the future.

### **IFC Performance Standards**

Key deficiencies in respect of the IFC PS's include the following:

- The ESIA “considered” the IFC PS's and in most respects the Project complies with PS1. However, placing of waste rock in the Kwanza River was not anticipated or assessed in the ESIA and is considered a gap. Grievance mechanisms need to be formalised and made known to the community, as well as to workers and sub-contractors. ENE's capacity is difficult to gauge and a program to build capacity and systems is recommended;
- Odebrecht applies the laws of Angola prescribing working conditions;
- Waste treatment and disposal facilities in Angola are known to be inadequate and the fate of many (hazardous) wastes is uncertain, and it is not clear where they will be disposed or to what extent third parties will be used. Limited application of energy and water use efficiency principles is evident;
- The series of rapids on the Kwanza River could be regarded as a unique ecosystem under threat from the cumulative impacts of the series of eight dams planned for this reach of the river. Cumulative impacts were not assessed and PS1 is clear that the Project should consider cumulative impacts; and

- A number of species registered on Angola's Red List of Endangered Species and on the International Union for Conservation of Nature (IUCN) Red List occur in the area. However, there is no Biodiversity Action Plan or Biodiversity Management Plan, and most efforts are or will be focused on rehabilitation.

### **Equator Principles**

Notable deficiencies (excluding any listed under the IFC PS's) include the following:

- The impact identification and evaluation process is systematic and based on a Rapid Impact Assessment Methodology (RIAM), but is not considered to be comprehensive;
- Labour and workplace health and safety impacts are not included or assessed in the ESIA, but it is evident that Odebrecht has the skills and capacity to ensure sustainable HSE management during construction;
- There is no system or audit trail which demonstrates that the EHS guidelines have systematically been incorporated into Odebrecht's management system;
- The Public Consultation and Disclosure Plan (PCDP) and stakeholder engagement may have satisfied Angolan requirements, but are considered deficient in terms of GIIP. Early and prior disclosure to all parties did not occur and/or was inadequately documented, and was not sufficiently ongoing; and
- A grievance mechanism for the community is not adequately defined, documented and disclosed.

### **World Commission on Dams and World Bank Safeguard Policy for Dams**

Notable deficiencies in respect of WCD Strategic Priorities Review and World Bank Safeguard Policy for Dams review requirements include the following:

- Cumulative basin-wide impacts are not considered;
- There is no documentation pertaining to negotiations on mitigation and benefit sharing mechanisms; and
- A dam safety assessment was not undertaken; however the risk of dam failure is considered low based on seismic reports and reports to inform engineering design. Dam design and review by experienced engineers also provides considerable assurance with respect to dam failure. .

### **IFC EHS Guidelines**

There is no system or audit trail which demonstrates that the IFC EHS guidelines have systematically been incorporated into Odebrecht's management system and procedures.

### **Review Conclusions**

This review has shown that the Cambambe Project complies with host country legislation, but that additional work is required to make progress towards meeting international standards. Virtually none of the gaps and deficiencies is considered material, and can be addressed in the short to medium term and incorporated in conditions and covenants attached to loans.

The key risks for the project which need to be addressed, include the following:

- Assessment of environmental impacts;
- Capacity and management;
- Disclosure and public acceptance;
- Grievance mechanisms;

- Waste management;
- Rehabilitation;
- Housekeeping;
- Dam safety; and
- Biodiversity.

Less critical risks, relate to:

- Health, safety, labour conditions and security;
- Emergency response;
- Energy and resource efficiency; and
- Heritage.

A Corrective Environmental and Social Action Plan (ESAP) sets out specific requirements for addressing each risk and gap, comprising Required Actions (addressing key risks and issues that must be addressed), and Recommended Actions (addressing additional gaps of lower risk, not included in the Executive Summary).

SRK recommends that annual or bi-annual verification of the implementation of the EP and PS be undertaken by qualified and experienced independent environment and social experts.

**Corrective Environmental and Social Action Plan: Required Actions**

<b>PART 1: REQUIRED ACTIONS</b>				
<b>#</b>	<b>Relevant Standard</b>	<b>Comment/Gap</b>	<b>Corrective Action</b>	<b>Indicators for Completion</b>
<b>KEY RISK: ASSESSMENT OF CUMULATIVE IMPACTS</b>				
1.	PS1, PS6, EP2, WCD SP4	<p>An Environmental Impact Assessment (EIA) incorporating an Environmental Management Plan (EMP) was compiled and an Environmental Licence was awarded to ENE-EP on 26 April 2011. A comprehensive baseline survey was undertaken and impacts were assessed, albeit in a somewhat perfunctory manner. Cumulative impacts were not considered.</p> <p>Some major changes to the project description were not described or assessed in the EIA, and some on-going changes are anticipated</p> <p>The series of rapids on the Kwanza River could be regarded as a unique ecosystem under threat from the cumulative impacts of the series of eight dams planned for this reach of the river. This is not discussed or assessed in the EIA. As the Kwanza River crosses four provinces, there is debate within Angola which suggests that central government is assigned the responsibility for assessing such cumulative impacts. However PS1 requires that the Project assesses cumulative impacts.</p>	<p>Incorporate a procedure in Odebrecht's EHS system which describes, assesses and discloses major project changes to stakeholders, authorities and the Lender Group.</p> <p>Assess cumulative impacts of the dams on the Kwanza River prior to the development of any new dams and implement/retrofit relevant mitigation measures.</p>	Project change procedure.
<b>KEY RISK: ASSESSMENT OF ENVIRONMENTAL IMPACTS</b>				
2.	PS1	Surplus material (waste rock) is not being dumped in locations identified in the Draft EIA. Of particular potential concern is surplus material being placed on the right bank of, and in, the Kwanza River, downstream of the proposed powerhouse in order to create a platform for the construction of a new road.	<p>Assess impacts of rock placement in the Kwanza River and submit to MinAmb for their consideration and guidance, through proposed procedure to assess project change.</p> <p>Implement recommendations of the assessment.</p>	Assessment of rock placement in the river.
3.	PS1	The assessment of transmission lines has been excluded from the EIA and associated impacts have not been assessed.	Assess impacts of transmission lines and any associated infrastructure. Implement recommendations of the assessment.	Assessment of transmission lines.
<b>KEY RISK: INTEGRATED MANAGEMENT SYSTEM</b>				
4.	PS1, EP3, EP4, EP5, WCD SP5, WCD SP6	<p>It is not possible to ascertain if the mitigation measures in the EIA and conditions of the Environmental License have been captured in Odebrecht procedures.</p> <p>There is no documentation pertaining to negotiations on mitigation or benefit sharing mechanisms.</p>	<p>Ensure that all mitigation measures identified in the EIA as well as conditions of the Environmental License and IFC EHS Guidelines are integrated into Odebrecht and ENE policies, plans and procedures. Demonstrate integration, e.g. in a Commitments Register.</p> <p>Include clear procedures for monitoring in the EMP, including criteria, indicators and measurable events against which implementation can be monitored</p>	Revised plans. Commitment Register (or similar document).
5.	EP9	Internal inspections of facilities are conducted by HSE staff on a weekly basis. Odebrecht is also committed to retaining independent and credible international HSSE consultants to verify monitoring reports underpinning semi-annual regulatory submissions and financial covenants.	Appoint qualified and experienced independent environment and social experts to verify monitoring information (and implementation of the EP and PS).	Appointment of specialists Independent audit reports.

6.	PS1	Odebrecht have recently developed a legal compliance register to be used as the basis of regular legal compliance reviews.	Undertake legal compliance review during annual audit. Revise legal compliance register to reflect any changes to legislative requirements.	Legal compliance audits
<b>KEY RISK: CAPACITY AND MANAGEMENT</b>				
7.	PS1, EP4.	<p>ENE reports that they have an Operations Manual with procedures addressing operations and maintenance, as well as a suite of HS instructions. However, ENE does not have an integrated management system addressing HSE matters. ENE has a SE department, though its capacity could not be ascertained. ENE's Dams Security and Observation department is responsible for addressing possible construction and infrastructure failure, and seismology.</p> <p>It is difficult to gauge ENE's systems and capacity to manage HSE issues during operations, recognising that there should be far fewer HSE challenges during this phase. ENE has advised that systems and capacity will be developed, but at this stage it would be premature to make a definitive judgment as to the probable efficacy of and/or confidence in these proposed systems.</p>	Undertake skills needs assessment for EHS&C team.	Skills needs assessment.
			Build ENE's HSE capacity, and provide assistance in developing suitable plans policies and procedures prior to handover of the facility to ENE.	Capacity building plan.
			Consider job shadowing now as a component of capacity building.	Placement.
			Review progress on ENE's HSE systems annually and into the first few years of operation.	HSE review report.
<b>KEY RISK: LAND ACQUISITION AND DISPLACEMENT</b>				
8.	PS5	Based on surveys of the area to be inundated undertaken by Odebrecht and Holisticos, no known physical or economic displacement will occur. Since there are a number of small subsistence fields in close proximity to the inundated area, it is possible that additional fields (some opportunistic) may be established in the area prior to inundation. To preclude later claims, the boundaries of the inundated area, confirmed absence of economic activity in this area and a policy which will not compensate new activities in this area, should be clearly communicated to local communities and stakeholders.	Review the area to be inundated to confirm no economic displacement. Inform stakeholders of the boundaries of the inundated area and cut-off date for determining the need for economic displacement.	Records of public disclosure regarding inundation and cut-off date for determining eligibility for compensation.
<b>KEY RISK: DISCLOSURE AND PUBLIC ACCEPTANCE</b>				
9.	PS1, EP5, WCD SP1	<p>Early and prior disclosure to all parties did not occur, and was not sufficiently ongoing. Documentation of the consultation process, e.g. comments and responses, is not comprehensive.</p> <p>An interim report (such as a Scoping Report, as prescribed by the WCD Guidelines) capturing issues and presenting proposed terms of reference was not compiled or released.</p> <p>Given that many communities were unaware of the project it is not possible to gauge public acceptance</p>	Develop and implement a more detailed Stakeholder Engagement Plan and ensure that it allows for adequate and on-going consultation with affected communities during and after construction and that all comments and responses are adequately documented.	Stakeholder Engagement Plan.
10.	PS2, EP5, WCD SP1	Engagement with local stakeholders, notably Cambambe village, is thorough, driven mostly by the Chaleno Kiambote initiative. However, engagement plans with the wider community and – at times – the region, are not formalised.	Compile a Stakeholder Engagement Plan, including identification and analysis of stakeholders, appropriate methods of engagement and a programme for such engagement.	Stakeholder Engagement Plan.
<b>KEY RISK: GRIEVANCE MECHANISM</b>				
11.	PS1, PS2, EP6	Odebrecht has a communication procedure which includes a grievance mechanism for workers and sub-contractors although these could be better defined, documented and	Develop and implement a more formalised grievance mechanism, separate from the suggestions procedure.	Internal grievance mechanism.

		communicated.		
12.	PS1, PS5, EP6, WCD SP1	Though relationships and communication with most communities appear to be excellent, grievance mechanisms for external stakeholders (communities) are not adequately defined, documented and communicated.	Develop and implement a more formalised grievance mechanism for external stakeholders, not only targeting Cambambe village.	External grievance mechanism.
<b>KEY RISK: WASTE MANAGEMENT</b>				
13.	PS3, WCD SP2	Management of waste on site, and in Angola in general, is a challenge, although SRK is aware of some improved facilities, mostly established to service the Oil & Gas sector. A waste dump is currently being established (delivery of geofabric liners is awaited) in a former borrow pit, although the size of this facility and distance from work areas do not seem appropriate. Odebrecht advises that the design of the waste facility has been undertaken in line with local and international waste facility design standards. However, the design was not typical of most landfills seen by SRK. A solid waste management strategy has been developed by Odebrecht to address hazardous and non-hazardous waste during the construction phase. Recyclable wastes are separated although Odebrecht is uncertain who would be able to recycle these materials. Consequently many wastes are being stored on site, but their fate once construction concludes is uncertain. The fate of hazardous and metal residues is more uncertain, however Odebrecht plans to install facilities on site for the incineration of hazardous wastes.	Develop a Waste Management Plan including the investigation of various options for waste disposal/recycling. Demonstrate that the landfill design meets GIIP.	Waste Management Plan
<b>KEY RISK: REHABILITATION</b>				
14.	PS3,	Aside from being dumped, surplus material has also been used in multiple locations (e.g. as fill material for accommodation camps, stores, etc.). Rehabilitation may be more challenging than anticipated, although Odebrecht has indicated they are confident that rehabilitation will be successful and have a rehabilitation plan in place.	Ensure that rehabilitation programs and budgets are adequate to achieve desired outcomes. Commence sequential rehabilitation.	Revised Rehabilitation Plan.
<b>KEY RISK: HOUSEKEEPING</b>				
15.	PS1, WCD SP2	General "housekeeping" on site requires some attention e.g. waste management and storage, management of run-off from refuelling areas and the cement wash bay could be improved.	Ensure that environmental procedures for construction activities cover general "housekeeping" issues. Undertake regular inspections and implement corrective action immediately. Revise the EMP and Sub-Programs to include clear procedures for monitoring including criteria, indicators and measurable events against which implementation can be monitored. Ensure that procedures are in place to ensure implementation and monitoring of all requirements contained in the EIA, EMP and Sub-Programs, as well as IFC EHS Guidelines and conditions of the Environmental License	Revised EMP.

<b>KEY RISK: DAM SAFETY</b>				
16.	WB SP2	Emergency preparedness and response plans have been prepared, although these do not currently address dam failure. However, a procedure has been developed to establish emergency responses in the case of a dam failure. A specific dam safety assessment was not undertaken; however the risk of dam failure is considered low based on seismic reports as well as studies undertaken by Engevix to inform Engineering design. Dam design was outsourced to Stucky Engenharia and peer reviewed by Lombardi, which provides considerable assurance with respect to dam failure. The Angolan government is developing a national Emergency Response Plan which should address dam failure, although the status of this plan is unknown.	Incorporate emergency response procedures in case of dam failure in the ERP, in consultation with external stakeholders.	Revised Emergency Response Plan
			Communicate response procedures to all potentially affected stakeholders.	
17.	WB SP2	It is not apparent that project construction and will be independently reviewed.	Conduct an independent review of project construction and operation.	
<b>RISK: BIODIVERSITY</b>				
18.	PS6	There is no Biodiversity Action Plan or Biodiversity Management Plan, and most efforts are or will be focused on rehabilitation. A number of species registered on Angola's Red List of Endangered Species and on the International Union for Conservation of Nature (IUCN) Red List occur in the area.	Develop a Biodiversity Management Plan aimed at identifying and implementing measures to reduce impacts and restore biodiversity and ecosystem services. The Biodiversity Management Plan must address protection of Red List species.	Biodiversity Management Plan.
<b>PART 2: RECOMMENDED ACTIONS</b>				
<b>KEY RISK: INTEGRATED MANAGEMENT SYSTEM</b>				
19.	PS1, EP3	Odebrecht has a comprehensive suite of HSE policies, plans and procedures in place, which are integrated into a system, though it is not a formalised, certified e.g. ISO 14001 system. It is important that continuous improvement is maintained.	Demonstrate continuous improvement of environmental performance.	Management review of system to demonstrate continuous improvement.
<b>RISK: EMERGENCY RESPONSE</b>				
20.	WB SP2	Emergency response plans exclude responses or assistance in the local community (notably Cambambe Village) although emergencies are considered unlikely to affect the community. Odebrecht is committed to providing adequate resources to deal with an emergency situation during construction and to participate in emergency response planning post-construction.	Revise the ERP in consultation with authorities and local communities.	Revised Emergency Response Plan.
<b>RISK: HERITAGE</b>				
21.	PS8	It does not appear that a formal heritage assessment was undertaken as part of the EIA, in accordance with international good practice standards and guidelines.	Undertake a more detailed heritage survey including consultation with relevant authorities and communities.	Heritage assessment.

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## Acronyms and Abbreviations

AIDS	Acquired Immuno Deficiency Syndrome
CESCE	Spanish Export Credit Agency
EHSS	Environmental, Health, Safety and Security
EP	Equator Principles
ESDD	Environmental and Social Due Diligence
IFC	International Finance Corporation
ECO	Environmental Control Officer
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Programme
ENE-EP	Empresa Nacional de Electricidade
ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plans
ESMS	Environmental and Social Management System
GEL	General Environmental Law
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GWh	Gigawatt hours
HIV	Human Immunodeficiency Virus
HSBC	Project and Export Finance Division of HSBC Bank plc
HSE	Health, Safety and Environment
Hm	Hectometre
ISO	International Organisation for Standardization
IUCN	International Union for Conservation of Nature
kV	Kilovolts
LRP	Livelihoods Restoration Plan
MIGA	Multilateral Investment Guarantee Agency
MinAderp	The Ministry of Agriculture, Rural Development and Fisheries
MinAmb	<i>Ministério do Ambiente</i> (Ministry of Environment)
MW	Megawatt
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-governmental Organisation
OECD	Organization for Economic Cooperation and Development
OHS	Occupational Health and Safety
OP	Operational Policies
PCDP	Public Consultation and Disclosure Plan
PPE	Personal protective equipment
PS	Performance Standard
SoW	Scope of Work
RIAM	Rapid Impact Assessment Methodology

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TDT	Daily Safety Dialogue
UNCBD	United Nations Convention on Biological Diversity
WB	World Bank
WB SP	World Bank Safeguard Policies
WCD	World Commission on Dams
WCD SP	World Commission on Dams Strategic Priorities
WHO	World Health Organisation

## Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd ("SRK") by HSBC Bank plc ("HSBC") and Odebrecht. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this Report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

# 1 Introduction and Scope of Work

The Project and Export Finance Division of HSBC Bank plc (“HSBC”) has been appointed by the Ministry of Finance of the Republic of Angola to arrange the financing for the Phase 2 of the Cambambe Dam Project (the “Project”) being implemented by Empresa Nacional de Electricidade (ENE) with the construction works being performed by Odebrecht.

HSBC has approached the Multilateral Investment Guarantee Agency (“MIGA”), Euler Hermes (the German Export Credit Agency), CESCE (the Spanish Export Credit Agency) and a number of commercial banks (together referred to as the “Lenders Group”) to assist in the financing of the Project.

SRK Consulting (South Africa) Pty Ltd (“SRK”) was appointed as the Independent Environmental and Social Consultant (the “Environmental Consultant”) to undertake the pre-financial close Environmental and Social Due Diligence (ESDD) to provide an environmental and social review/appraisal to support the proposed financing.

The Cambambe Hydroelectric Facility is one of two hydroelectric power stations currently in operation on the Kwanza River, 180 km southeast of Luanda, Angola. The Cambambe plant was built in 1964 and consists of a 102 m high dam with an open crest-of-the-dam spillway, and an underground power house with four turbine generators rated at 45 MegaWatt (MW) each, of which only two are currently in operation.

The Government of Angola, through the Ministry of Energy and Water and ENE, the state-owned power utility, has embarked on a capacity expansion programme. The Cambambe Dam rehabilitation and expansion project forms an integral part of this programme and will comprise three phases:

- Phase 1: Rehabilitation of the four existing turbine generators that are currently not operational;
- Phase 2: Construction of a second powerhouse with four additional turbine generators, with an initial capacity of 175 MW each, or 700 MW in total. The turbines will be housed in an open powerhouse and the civil works part of this phase have already commenced; and
- Phase 3: Heightening of the dam crest by 30 m to the total height of 132 m and the construction of a lateral spillway.

Note that transmission is excluded from the scope of the ESDD. Also, the construction of the new road and bridge is the subject of a separate ESIA process and is excluded from the scope of this review.

The ESDD was conducted according to the Lenders Group standards. Compliance was assessed in terms of the International Finance Corporation (IFC) Performance Standards (PS) (2012), World Bank (WB) Safeguard Policy (WB SP) Safety of Dams (OP 4.37, 2001), Core Values and Strategic Priorities of the World Commission on Dams (WCD) (2000), the Equator Principles (EP) and Angolan legislation.

## 1.1 Objectives

The two main objectives of the ESDD are to:

- Summarize the relevant characteristics of the Project related to environmental, social, and health and safety aspects based upon a review of existing information, including Project scoping and Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plans (ESMP) and related documents; and

- Evaluate the adequacy of the proposed Project's environmental, social, and health and safety assessments, plans and procedures and present conclusions and recommendations associated with identified deficiencies or issues.

## 1.2 Scope of Work

SRK's Scope of Work (SoW) involved the following tasks:

- **Task 1: Project scoping, review and appraisal of ESIA/ESMP related documents and construction phase reports:**
  - Review all relevant environmental, social, and health and safety Project documents and information;
  - Review terms and conditions of construction contracts addressing Environmental, Health Safety, and Security (EHSS) issues;
  - Review the status, quality and robustness of the construction contractor's EHSS system;
  - Review construction progress reports; and
  - Prepare a "Gap Analysis" to identify any material gaps between the existing Project scoping/ESIA/ESMP related documents and the Lenders Group standards.
- **Task 2: Construction site audit at construction fronts, the Cambambe Dam site and Odebrecht's premises:**
  - Visit all areas where construction is taking place, the adjacent areas potentially affected by construction activities and the areas to be flooded by the dam;
  - Verify adherence to the applicable environmental and social and health and safety management systems, plans and procedures for construction, with digital photo-documentation of observations;
  - Meet/discuss potential issues with contractors and environmental inspectors;
  - Discuss potential issues with local residents, civil authorities and local Non-governmental Organisations (NGOs) (if applicable);
  - Prepare a summary on the principal findings regarding the Project's environmental, social and health and safety and labour performance, and recommendations to correct deficiencies; and
  - Respond to matters raised by any party of the Lenders Group, whether relating to the summary or final reports or otherwise.
- **Task 3: Disclosure:**
  - Assist parties of the Lenders Group that have requirements / policies for disclosure of documents and public consultation;
  - Track comments received during the disclosure period; and
  - Assist with responses, summary reports, etc.
- **Task 4: Environmental and Social covenants in financial documentation:**
  - Assist (as requested) with the negotiation of EHSS and social requirements of the financial documents (i.e. loan agreements, common terms agreements, etc);
  - Include items such as monitoring provision, change management, assessment of non-compliances, implementation of environmental and social action plan, etc.; and

- Attend meetings and conference calls, as needed by the Lenders Group.
- **Task 5: Reporting:**
  - Compile a Draft ESDD Report presenting the results and conclusions of the detailed review of all scoping and ESIA/ESMP related documents and an appraisal of their adequacy and project compliance with the Lenders Group standards; and
  - Compile a Final ESDD Report taking into account all comments received from the client.

## 2 Review Process and Method

### 2.1 Desktop Review of Documentation

All relevant and available documentation and data was reviewed by SRK prior to the site visit. This included EHSS components of contracts and contractors' EHSS systems. All standards pertinent to the review were studied, including national regulatory requirements. Construction progress reports were reviewed in terms of their adequacy and to identify persistent environmental issues which may have arisen to feed into the gap analysis.

The key documentation reviewed included:

- **ESIA:** An ESIA was prepared by Angolan consultants, Holisticos in order to fulfil the national environmental regulatory requirements of Angola. The ESIA also makes reference to relevant international standards, including the World Bank and IFC's directives and PS's, applicable to the project. The draft ESIA, dated December 2010 was revised and finalised in December 2012 following public hearings.
- **Sub Programs:** An Environmental Management Programme (EMP) developed by Holisticos is included as Chapter 6 of the ESIA. The EMP comprises five Sub-Programs as vehicles for implementation:
  - Social Communication Sub-Program;
  - Education and Environmental Awareness Sub-Program;
  - Social Support Sub-Program;
  - Construction Support Sub-Program; and
  - Bio-physical Monitoring Sub-Program.

The Sub-Programs are in effect management frameworks, not detailed plans or procedures.

- **Environmental Licence:** An Environmental Licence was awarded to Empresa Nacional de Electricidade (ENE-EP, also referred to in this report as ENE) on 26 April 2011, valid until 25 April 2014, which includes a set of conditions.
- **Odebrecht Health, Safety and Environment (HSE) documents:** A comprehensive suite of HSE policies, plans and procedures has been developed by Odebrecht, relating mainly to the construction phase of the project. This includes an Emergency Response Plan (ERP).

### 2.2 Gap Analysis

SRK considers this a critical element of the ESDD. A summary of Angolan regulatory environment and relevant policies and guidelines, as well as international standards and benchmarks is presented in Section 6. A comprehensive and detailed gap analysis, which highlights compliance criteria, gaps and recommendations, is provided.

### 2.3 Site Visit

A site visit was undertaken by Christopher Dalglish and Sharon Jones from 14 to 18 January 2013 to gain an appreciation of the project and its social and environmental contexts. The visit also provided an opportunity to assess performance against EHSS systems, plans and procedures and to assess labour performance, defined as those labour related issues covered in IFC PS 2 – mainly around systems, employee grievances and fair treatment, equal opportunity and non-discrimination, child and forced labour.

During the course of the visit, the SRK team engaged with relevant contractors and key external stakeholders, where possible, including the community in the zone of influence of the operation (community representatives/leaders), government departments (including those responsible for water and environmental regulation), NGOs and civic organisations.

The main activities for each day are summarised in Table 2-1 below.

**Table 2-1: Daily activities undertaken on the site visit**

Day	Activities
Day 1, Monday 14 January	<ul style="list-style-type: none"> <li>Welcome and introduction to Odebrecht by Contract Director, Gustavo Belitardo.</li> <li>Visit to Odebrecht's Memory Centre, Luanda.</li> <li>Travel to Cambambe.</li> <li>Introduction to the HSE Team by HSE Manager, Joao Bosco Barros.</li> </ul>
Day 2, Tuesday 15 January	<ul style="list-style-type: none"> <li>Safety Induction and presentations on Safety and Environmental programmes by Marclei Rodrigues Queiroz Ayres Dantas, Safety Technician.</li> <li>Presentation of Health systems by Occupational Physician, Dr Enrique Ivan Bolanos Hidalgo.</li> <li>Presentation on Corporate Social Responsibility programmes by Social Representative, Sergio Rezende.</li> <li>Discussions with the HSE Team, including the HSE Manager (Joao Bosco Barros) and various representatives of the HSE Team, including the Occupational Physician, Social Representative and Environmental Engineer (Isis Andrade Neves).</li> <li>Site visit guided by Gustavo Belitardo and Joao Bosco Barros among others, to get a general overview of the operations (dam, spillway, waste facilities etc.), construction activities and understand the site, risks and impacts.</li> <li>Visit to Cambambe Village, program "Acreditar" and Chaleno Kiambote.</li> <li>On-going discussions with the HSE team.</li> </ul>
Day 3, Wednesday 16 January	<ul style="list-style-type: none"> <li>Drive through area to be inundated, including the existing road, new road alignment and Kiamafulo Bridge and beach.</li> <li>Visit to local community Terra Nova, upstream of the dam to understand possible impacts including the possibility of economic displacement.</li> <li>Meeting with ENE representative, Joao Eduardo Borges, Director of Cambambe Rehabilitation project, and Alberto Carneiro Cambambe Project Director to understand ENE's HSE systems and capacity.</li> <li>On-going discussions with HSE team.</li> <li>Meeting with sub-contractor (JF Construction) to understand implementation of HSE policies and procedures by sub-contractors to Odebrecht.</li> </ul>
Day 4, Thursday 17 January	<ul style="list-style-type: none"> <li>Meeting with Kwanza North Administrator and managers in Dondo: Mateus de Costa, Francisco Diogo, Joao Cunda and Clementina Rodrigues, to determine awareness of and concerns regarding the project.</li> <li>Meeting with Gustavo Belitardo to discuss high level management issues.</li> <li>Travel to Luanda.</li> </ul>
Day 5, Friday 18 January	<ul style="list-style-type: none"> <li>Meeting with Dr. Julieta Condez - National Director of Prevention and Environmental Impact Assessment, <i>Ministério do Ambiente</i> (MinAmb), in Luanda to discuss any possible concerns MinAmb may have around impacts or the ESIA process and whether there were any unusual conditions of approval imposed.</li> </ul>

Ana Ramos (representing SRK) met with Pedro Afonso, Sub Director for Production of ENE, on Wednesday, 30 January 2013 to gain further understanding of ENE's systems and capacity to manage HSE issues.

## 2.4 Preliminary Feedback

Preliminary high-level findings, key issues and concerns and especially red flags and recommendations for corrective action were summarised shortly after the site visit, and forwarded to

the client. Informal preliminary feedback was also provided to Odebrecht at a close out session concluding the site visit.

## 2.5 Reporting and Discussion of Findings

The Draft ESDD Report presented the results and conclusions of the detailed review of all ESIA/EMP related documents, Odebrecht plans and procedures applicable at the time of the site visit, and other documents listed in the SoW (see Section 1.2), and an appraisal of their adequacy and project compliance with the Lenders Group standards. The Draft Report was submitted to the Lenders Group, Odebrecht and ENE for their review and comment in February 2013.

The Draft ESDD Report contained the following:

- Results and conclusions of the detailed review and expert evaluation of the environmental and social aspects of the Project, based upon the review of existing information and documents and the construction site audit;
- Statement on any significant deficiencies or issues related to the content and quality of Project related documents or Project-specific EHSS or social aspects;
- Conclusions and recommendations/proposed mitigation measures associated with any major deficiencies/ issues identified in the Project;
- An Environmental and Social Action Plan (ESAP) with clear statements on the Project's level of compliance with host country and international standards, along with actions and timescales for achieving compliance; and
- A Compliance matrix for the Project, summarising and comparing Project requirements with Lenders Group standards, the extent to which these have been met and the actions required to meet them.

## 2.6 Final Report

Following review of the draft document, SRK undertook an additional site visit and attended meetings with the Lenders Group, Odebrecht and ENE between 18 and 21 February, to discuss the findings and recommendations of the Draft ESDD and further understand specific requirements of the Lender Group. In response to the findings of the Draft ESDD Report, Odebrecht also submitted to SRK a number of revised procedures aimed at addressing the gaps and concerns identified by SRK.

The Final ESDD presents the revised findings of the study, taking into account the discussions held with the Lender Group and amendments to project plans and specifications made by Odebrecht. The Final ESDD is very similarly structured to the Draft ESDD, but takes account of gaps which have been closed since release of the Draft ESDD; as such it reports fewer gaps and the ESAP is consequently appropriately trimmed.

It is anticipated the Final ESDD will be disclosed by the Lender Group, along with the ESIA.

## 3 Project Background

This section briefly describes the Project and is based on both the information provided in the ESIA documentation, and the information from interviews with Odebrecht personnel on site.

### 3.1 Project Overview

The Cambambe Hydroelectric Project is located on the border of the North Kwanza and South Kwanza provinces on the middle stretch of the Kwanza River, 11 km south-east of the city of Dondo and 180 km south-east of Luanda.

The construction of the Cambambe Dam was completed in 1962. The arch-shaped, double-curvature dam wall is approximately 68 m high with the crest of the wall at an elevation of 112.75 m (at the shoulders) and the central section of the wall at an elevation of 102 m. The dam has an open crest-of-the-dam spillway. An underground powerhouse (Cambambe I) contains four vertical Francis turbine generators with an output of 45 MW<sup>1</sup> each, although only two of the generators are currently operational. Water flow to and from the powerhouse is managed in one intake channel, two bottom discharge channels and a deviation channel.

Material for the dam wall was sourced from a quarry in the northern bank of the river.

The dam wall requires structural reinforcements (i.e. reinforcement of the bottom dissipation slab to reduce erosion, construction of a concrete wall to increase downstream energy dissipation capacity, and construction of concrete side walls to limit the overflow zone) in order to maintain the integrity of the dam in its current state.

The Cambambe Hydroelectric Project also includes the following structures:

- A Substation for power transformation and connection into the power grid;
- General workshops;
- Offices for operation personnel;
- A work yard/warehouse for storage of materials; and
- Cambambe Village<sup>2</sup>.

The Government of Angola, through ENE, has embarked on a capacity expansion programme. The Cambambe Dam rehabilitation and expansion project will comprise three phases:

- **Phase 1:** Rehabilitation of the four existing turbines generators that are currently not operational;
- **Phase 2:** Construction of a second powerhouse (Cambambe II) with four additional turbine generators with a capacity of 175 MW each, or 700 MW in total<sup>3</sup>.
- **Phase 3:** Heightening of the dam wall by 30 m to an elevation of 132 m and the construction of a lateral spillway in the southern bank.

As a result of the increased dam wall height, a 4 km stretch of the Dondo-Huambo road will need to be relocated and a new bridge will be required to replace the current Kiamafulo Bridge which will be flooded. Though briefly described in the ESIA, the construction of the new road and bridge is the subject of a separate ESIA process which is currently being undertaken by Holisticos.

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<sup>1</sup> The turbines have an installed capacity of 65 MW each, but as a result of the lower water level, the output from each turbine is only 45 MW.

<sup>2</sup> Current employees and ex-employees of the Cambambe Hydroelectric Facility live in the Cambambe Village.

<sup>3</sup> Total combined capacity for Phase 1 and 2 is 960 MW, assuming high water levels.

The total annual energy output of the two powerhouses will be 4 914 GWh distributed into the Angolan Electricity Transmission System via a new 400 kV substation. The new substation will also be connected to the existing substation by a 220 kV line.

The Cambambe Dam currently has a small storage capacity and the dam operates in the run-of-river mode. Once the height of the dam wall has been raised from 102 m to 132 m, with an average water level of 130 m, the surface area of the reservoir will be 5.5 km<sup>2</sup> with a “useful” capacity of 45.9 Hm<sup>3</sup>.

The new hydraulic generation circuit of Cambambe II includes one water intake, three feed tunnels and an outlet tunnel from each of the turbines. The tunnels will be excavated out of the rock. Internal roads and services/facilities (i.e. water, sewage, waste and electricity) will also be constructed within the site. In addition, a surplus materials (rock) dump, central concrete facility and central crushing facility will be established.

Support infrastructure<sup>4</sup> for the proposed development includes the following:

- A central office, administration office and medical station;
- Lodging facilities for management, indirect administration staff and direct staff<sup>5</sup>;
- An entertainment area, canteen, kitchen and laundry;
- Multi-sports courts and a tennis court;
- A work yard and mechanical, electrical and industrial workshops<sup>6</sup> and offices;
- Warehouses and sheds;
- A concrete laboratory;
- A gas station; and
- A work yard downstream of the discharge tunnels.

The quarry, identified for source material, is located downstream of the dam approximately 600 m from the existing powerhouse and outlet tunnel. However, Odebrecht indicated (in February 2013) that sufficient material is available from excavations and the quarry may not be utilised.

## 3.2 Programme

Construction/rehabilitation of the dam, i.e. Phases 1, 2 and 3, will last for approximately 44 months. Project documentation has not considered closure of the site as, according to Odebrecht, the operating life is reported to be several decades.

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<sup>4</sup> Some of this infrastructure has already been built.

<sup>5</sup> The lodging area will be an 8.4 hectare area located north-west of the main entrance.

<sup>6</sup> A water/oil separator and sedimentation tank will be constructed at each workshop.

## 4 Environmental and Social Setting of the Project

Based on a review of documentation and observations during the site visit, the setting of the Cambambe area and surrounds displays the following environmental, socio-economic and cultural features:

### 4.1 Environmental

- **Climate:** The climate of the Angolan coastal region is classified as semi-arid with distinct wet (November to April) and dry (May to October) seasons. Rainfall varies from 600 – 800 mm per year with a highly variable distribution over the region. A short dry period, the *cacimbo*, occurs in the rainy season. Cambambe has average annual temperatures of between 25 °C to 26 °C. The hottest period is between November and April, while July and August are the coldest months.
- **Geology:** The mid-Kwanza region is characterised by extensive continental weaknesses including the Kwanza Horst, a linear upliftment of the latitudinal basement (300 km long and 20 – 50 km wide) separating two geological structures – the Maiombe Shield and a Shield in the north-west of the south-western Angola. A portion of the mid-Kwanza basin, located near Dondo, includes rock and crystalline formations of the Ancient Masse, characterised by a high degree of metamorphism. The rock types include gneisses, paragneisses, migmatites, mica shists and granitic-gneisses although there are rocky outcrops of non-metamorphasized rocks. Between the Upper Dondo and Kwanza River, there is a significant channel of schistic rocks associated with sandstone, high in feldspar. The formation of the overlying sediments occurs first in narrow edges and later widens significantly becoming part of the Kwanza sedimentary basin where there are outcrops of deposits.
- **Topography:** The Kwanza-Norte Province is made up of a number of peneplains, step formations from the interior to the coastline. This is an area dominated by fluvial erosive processes creating formations such as ridges, hills and mountains. The topography is undulating with well-defined, narrow drainage lines and steep slopes.
- **Soils:** The three primary soil types within the river valley are lithosoils associated with rocky outcrops, ferralitic tropical soils and the well-drained alluvial soils. The ferralitic soils are most common and are visible in well-defined layers in the steep slopes. It is a highly weathered and leached soil enriched in iron and aluminium.
- **Hydrology:** The water catchment area of the mid-Kwanza, with an area of 25 000 km<sup>2</sup> is one of the four sub-basins in the catchment area of the Kwanza River. Elevations range from 160 m to 1 000 m. Between Pungo Andongo and Cambambe, the Kwanza River drops sharply in elevation, with various rapids and waterfalls (cascades). The average annual flow of the Kwanza River is approximately 540 m<sup>3</sup>/s with the maximum flow occurring between March and April. The reach of the Cambambe Dam extends approximately 6 km upstream. Deposition of sediments in Cambambe Dam has reduced the storage capacity from 24 million m<sup>3</sup> to 19 million m<sup>3</sup>.
- **Water quality:** Water quality is compliant with World Health Organisation (WHO) standards except for coliform exceedances, indicative of contamination, and pH which was in the acidic range. The significant levels of bacterial contamination are associated with anthropogenic activities and /or discharges on or near the river. High metal concentrations occur on the river beaches, with both cadmium and mercury concentrations above permitted levels. High iron concentrations are likely caused by the dissolution of rocks with high iron content.
- **Flora:** The vegetation of the Cambambe region comprises Dry Forest Mosaic, predominantly deciduous, and low altitude Dry Savannah (Barbosa, 2009). Cambambe is situated in a transition zone between dry and wet climate vegetation. Various species of trees, shrubs and

herbaceous species grow profusely in the area making it rich and diversified in taxa occupying different habitats. The most prominent species can be separated into two sub-types: tall, semi-deciduous forests in valleys and galleries, supplemented by dense creepers and climbers; and dry savannahs with small patches of steppe-like formations. Restricted access to the area has preserved biodiversity, though fires in the dry savannah do occur frequently during the dry season. Pteridophytes can be found on the rocky margins formed by steep rock surfaces. Aquatic plant communities occur on the river margins and are tolerant of lengthy periods of inundation. These plants stabilise the river banks, protecting the banks from erosion. A number of species registered on Angola's Red List of Endangered Species and on the International Union for Conservation of Nature (IUCN) Red List occur in the area.

- Phytoplankton: The phytoplankton community is represented by four main groups: Diatomophyceae, Chlorophyceae, Dinophyceae and Cianophyceae. The Diatomophyceaea are the most abundant. The Cambambe environment is mesotrophic and has a reasonable conservation level given that there are few Cianophyceae and there is a richness of phytoplankton species.
- Fauna:
  - Zooplankton: Zooplankton is poorly represented with the community comprising a few species of rotifers, probably because these organisms are capable of adjusting to river flow and currents, and are capable of reproducing quickly.
  - Benthic macrofauna: Chironomidae larvae (mosquito family) are the only benthic macrofauna identified at sampling stations. This indicates that anthropogenic activities affect benthic communities because larvae of the Chironomidae family are considered to be good bio-indicators of water quality.
  - Fish: 31 distinct species of fish were identified from the families: Cyprinidae, Characidae, Hepsetidae, Claroteidae, Mochokidae, Schilbeidae, Clariidae, Cichlidae, Mormyridae and Mastacembelidae. The Cyprinidae and Cichlidae families display the greatest diversity and abundance. Undocumented endemic species may occur in the area, noting high species diversity in the area and the lack of knowledge of the biodiversity of the Kwanza River basin.
  - Birds: 89 avian species were identified in the area corresponding to 9.7% of the known species in Angola. Quasi-endemic species include the Ruppells parrot (*Poicephalus ruepelli*), rufous-tailed palm thrush (*Cichladusa ruficauda*), forest scrub robin (*Cercotrichas leucosticte*), bubbling cisticola (*Cisticola bulliens*), Gabon boubou (*Laniarius bicolor*), the pale-billed fire finch (*Lagonosticta landanae*) and the forest scrub robin (*Cercotrichas leucosticta*). Two species are on the IUCN's Red List – the peregrine falcon (*Falco peregrinus*) and the golden-backed bishop (*Euplectes aureus*).
  - Mammals: The following mammalian species were identified within the study area: serval (*Felis serval*), bush duiker (*Sylvicapra grimmia*), bushbuck (*Tragelaphus scriptus*), hare (*Lepus crashawi*) and rock hyrax (*Procavia capensis*). No rare or threatened species were observed.

## 4.2 Social

- The study area is situated at the confluence of three Provinces – South Kwanza Province, North Kwanza Province and Bengo Province.
- South Kwanza Province:
  - The population of the Province is estimated to be 2 294 069. The Province is divided into 12 municipalities and 36 communes. The main ethnic groups are the Kimbundus, the Ovimbundus and the Bakongos;

- The education network includes 545 schools with a teacher : learner ratio of 1:40;
- The public health network consists of 16 hospitals, 12 health centres and 137 primary healthcare units with an admissions capacity of 1 145 beds;
- The main livelihoods in the Province are in the fields of agriculture, animal husbandry, hunting, fishing and charcoal burning;
- The most commonly cultivated agricultural crops are cassava, maize, beans, sweet potato, rena potato and fruit. The most common commercial crops are coffee, banana and garden crops. The Province has enormous agricultural and forestry potential. Extensive forest areas have been cleared for pasture;
- Industry in the Province is limited and consists of mostly small- and medium-sized industries processing agricultural and forestry products; and
- Sumbe, the provincial capital, is accessible by road, air and water. A tarred road network connects some of the municipalities. Communities and settlements are connected by gravel roads.
- North Kwanza Province:
  - The population of the North Kwanza Province was estimated to be 654 000 in 2001. The Province is divided into 10 municipalities;
  - The education network in 2001 consisted of 503 schools of which 479 offered primary education and 5 offered secondary education;
  - The public health network in 2001 consisted of 3 hospitals, 11 medical centres and 53 primary healthcare units. Tsetse fly and the horse fly are a health risk in the Province;
  - The main livelihoods in the Province are in the fields of agriculture, fishing, hunting, animal husbandry and commerce;
  - The most commonly cultivated agricultural crops are cassava, maize, fruit trees, sweet potato, coffee, beans, peanuts and garden crops. The most common commercial crops are coffee, banana and garden crops. Coffee and wood are the main commercial products. The Province has huge agricultural and forestry potential;
  - The biggest industrial park is located in Cambambe. The Cambambe Hydroelectric Facility is located in this industrial park; and
  - The Province is connected to the cities of Luanda and Malanje by rail and there is a tarred road network linking the North Kwanza Province to other provinces.
- Bengo Province:
  - The population of the Bengo Province is approximately 500 000 with a population density of 12.2 inhabitants per km<sup>2</sup>. The Province is divided into 8 municipalities. The main ethnic group is the Ambundu;
  - The education network consists of 2 149 schools of which 1 533 offer primary education and 103 offer secondary education;
  - The public health network consists of 9 hospitals, 10 health centres and 109 primary healthcare units. The most frequently diagnosed diseases are malaria, tuberculosis, leprosy, trypanosomiasis, schistosomiasis, Human Immunodeficiency Virus (HIV)/ Acquired Immuno Deficiency Syndrome (AIDS), acute respiratory diseases, diarrhoea and blenorragea;
  - The main livelihoods in the Province are in the fields of agriculture, fishing, hunting, animal husbandry and trading;
  - The most commonly cultivated agricultural crops are cassava, maize, fruit, sweet potato, cashews, coffee, tobacco, beans, peanuts and garden crops. The most common commercial crops are coffee, banana and garden crops;

- There are very few industries operating in the Province; and
- Most of the cities in the Province are linked to one another and to other provinces by tarred roads. Communities/settlements are accessed only by tracks and trails.
- Area of Indirect Influence: the area where the customs and habits of the surrounding communities may be affected by the Project:
  - Several villages were identified in the area of indirect influence. None of these villages will be directly affected by the Project;
  - Many of these villages do not have schools, public health units, water supply systems and sewage systems;
  - Villagers use the Kwanza River for their water supply;
  - Many of the dwellings are made from wood, clay and grass;
  - SONEFE, Alto Dondo, Dondo and Muxima villages have sewerage systems that discharge directly into the Kwanza River;
  - Some industries (i.e. EKA Brewery, Coca-Cola Company) extract large volumes of water from the Kwanza River; and
  - No cemeteries or sacred areas will be affected by the Project.
- Area of Direct Influence: the area where the customs and habits of the surrounding communities will be directly affected by the Project:
  - Communities that will be directly affected by the Project include the village of Vila de Cambambe (2 595 inhabitants), the military de-mining camp (50 inhabitants) and the police station. Ten military dwellings/buildings will be directly affected by the inundation. No dwellings in Vila de Cambambe will be affected by the inundation;
  - The military camp is adjacent to the Kiamafulo Bridge. It is a temporary settlement consisting of tents and two brick structures. The camp is occupied by the de-mining team which is involved in the Project;
  - The Terra Nova village is approximately 2 km from the Kiamafulo Bridge. It is one of the largest villages and is inhabited by families who fled military unrest. There are a number of agricultural fields near the village none of which will be inundated;
  - The river beach will be inundated by the dam. The river beach is used by residents of Dondo, Alto Dondo and Vila de Cambambe for recreational purposes, drawing water, fishing and for the loading of charcoal onto boats for transport;
  - Communities in the area make use of medicinal plants to treat diseases;
  - Malaria and waterborne diseases and infections are common in the area. The Tsetse fly is endemic to the area and there is a special analysis laboratory and treatment centre in Dondo; and
  - The surrounding villages rely heavily on Dondo for schooling and health facilities.

## 5 Governance Framework

This section presents a summary of the governance framework relevant to the Cambambe Dam Project. Information is taken from review of legislation as well as SRK summaries of relevant international and other standards. Comment on the current status of compliance with the key elements of the governance framework is given in Section 6.

### 5.1 Angolan Laws and Regulations

The Republic of Angola is a unitary state based on the Constitution of 1975 (as amended, most recently in 2010), which provides the framework for the national administrative and organisational structure. Article 39 of the Constitution provides for the fundamental right of individuals to live in a healthy and non-polluted environment and establishes an obligation on the State to take the necessary actions to protect the environment and maintain the ecological balance.

Angolan law is enacted at the national level through different legislative instruments. The most important of these are laws and decrees as described below:

- **Laws:** these are the main sources of primary legislation and are passed by the National Assembly. They tend to cover broad issues and provide the enabling framework for the competent authorities to issue more detailed implementing legislation, e.g. decrees. Laws issued at national level apply throughout Angola, with implementation, monitoring and enforcement carried out at both the national and provincial levels.
- **Decree-laws and Decrees:** these are passed by the Council of Ministries, while Regulations (Executive Decrees) and Dispatches are normally issued by a ministry. They provide a subordinate form of primary legislation and tend to cover more specific issues (and are analogous to regulations adopted in many other countries).

Several pieces of national law refer to pollution of the environment, environmental impact assessment (EIA) and the protection of the environment in general. Angolan regulations tend to be fairly broadly framed and – as a rule – do not provide detailed standards (e.g. air quality, noise levels etc.) against which compliance can be measured. In the absence of such standards the default is to international standards (e.g. WB, European Commission) and, sometimes, to regional standards (e.g. South African). A synopsis of the relevant legislative and administrative framework is provided further below.

#### 5.1.1 Administrative Framework

##### 5.1.1.1 Ministry of Environment

MinAmb is responsible for the development and coordination of the country's environmental policy and the National Programme of Environmental Management. MinAmb is responsible for approving EIAs under *Decree No. 51/04 on Environmental Impact Assessment* and issuing Environmental Licenses in terms of *Decree No. 59/07 on Environmental Licensing*.

##### 5.1.1.2 Ministry of Agriculture, Rural Development and Fisheries

The Ministry of Agriculture, Rural Development and Fisheries (MinAderp) is responsible for defining and implementing national sectorial development policies and strategies for agricultural and agro-nutritional safety sectors, rural development and rural communities, fishing and aquatic biological resources and forestry resources.

### 5.1.1.3 Ministry of Energy and Waters

The Ministry of Energy and Waters monitors the execution of energy generation activities and the use of hydrological resources.

The National Electric Power Board provides technical support for power generation and distribution plants by participating in the concession award process, preparing appropriate standards, regulations and technical specifications, conducting technical audits and issuing quality certificates.

The National Hydrological Resources Board establishes guidelines for the preparation of plans for the integrated use of hydrological resources and hydrographic basins and coordinates the preparation of general proceedings for the use of hydrological resources.

### 5.1.2 Legislative Framework

The most critical legislative requirement pertaining to certain proposed projects is that a comprehensive EIA process for the project is undertaken. Typically this requires the compilation of an Environmental Impact Statement (EIS), incorporating environmental management measures, which are subject to comprehensive review by the authorities.

Items of legislation, which regulate the way in which EIAs are undertaken, are discussed below:

- The General Environmental Law No 5/98 (19/06/1998);
- Decree No. 51/04 on Environmental Impact Assessment (23/07/2004);
- Decree No. 59/07 on Environmental Licensing (13/07/2007);
- Executive Decree No. 87/12 on Public Consultation for Projects Subject to Environmental Impact Assessment (24/2/2012); and
- Executive Decree No. 92/12 on the Terms of Reference for Environmental Impact Studies (1/3/2012).

Additional legislation with relevance to the proposed Project includes:

- Decree No. 1/10 on Environmental Audits (13/01/2010);
- Decree No. 31/94 on the Establishment of the Principles to Promote Health, Safety and Workplace Conditions (05/08/1994);
- Executive Decree No.128/04 on Regulation on Safety and Health for Workplace Signalling (23/11/2004);
- Presidential Decree No. 194/11 on Liability on Environmental Damage (07/07/2011);
- Water Law No. 6/02 (21/06/2011);
- Presidential Decree No. 261/11 on Water Quality (06/10/2011);
- Joint Executive Decree No.37/99 on Animals that may not be Hunted (27/01/1999);
- Decree No. 40.040 on Protection of Terrestrial Fauna (20/01/1955);
- Resolution No. 42/06 on the National Biodiversity Strategy and Action Plan (NBSAP) (26/07/2006);
- Presidential decree No. 190/12, approves the Regulation on Waste Management;
- Territory and Urbanism System Law No. 3/04;

- Cultural Assets Law No. 14/05;
- Resolution No.52/08 on the National Strategy for the Implementation of UN Convention on Climate Change and Kyoto Protocol (05/06/2008);
- Land Law No. 9/04; and
- General Labor Law No. 2/00.

These are all briefly discussed below.

### 5.1.2.1 General Environmental Law No. 5/98

The General Environmental Law No. 5/98 (GEL, *Lei de Bases do Ambiente*) was promulgated in accordance with the Constitutional Law of the Republic of Angola. The purpose of the law is to provide the framework for environmental legislation and regulations; more specifically to “*define the basic concepts and principles for the protection, preservation and conservation of the Environment, promotion of Quality of Life and the rational use of Natural Resources*” (Article 1). The GEL incorporates international declarations which Angola has ratified (e.g. Agenda 21) and defines citizens’ rights and responsibilities. Further, the GEL introduces the concept of legal penalties for illegal activities that have caused damage to the environment.

Article 4 includes a number of principles guiding GEL, including a principle in respect of liability: “*all persons or organisations which through their actions cause harm to the environment, or the degradation, destruction or depletion of national resources, shall be held liable for the same, and shall be required to repair such damage and/or pay compensation for the damage caused*”.

Article 16 of GEL stipulates that an EIA, including public consultation (Articles 10 and 32), is mandatory for all undertakings which have an impact on the balance and wellbeing of the environment and society. Clause 2 of this Article states that more specific legislation on EIAs will be developed by the government. An excellent example is Decree No. 51/04 on Environmental Impact Assessment.

An Environmental Licence is issued on the basis of the EIA and this licence is required before any other license required by law will be granted (Article 17(2)).

### 5.1.2.2 Decree No. 51/04 on Environmental Impact Assessment

Decree No. 51/04 on Environmental Impact Assessment was established under the GEL in order to ensure better environmental protection from human activities likely to have an impact on the environment. It establishes a set of procedures to be followed when carrying out an EIA and compiling an EIS.

According to this Decree, an EIS should achieve the following objectives:

- Provide a description of the project;
- Report on the EIA; and
- Take into account all technological alternatives and the location of the project, bearing in mind the possibility of non-execution of the project.

Article 4 refers to a list of activities, annexed to the Act, that require an EIA. An Environmental Licence for the activities listed in this annex must be obtained before commencement. Other (unlisted) projects that may cause significant damage to the environment (as identified by MinAmb) may also be required to undergo an EIA and licensing process.

Article 7 prescribes the required content of the EIS, including a description of the ecological, biological and social environment, the identification of impacts, the 'definition of mitigation measures' and the requirement to draw up a monitoring programme.

Article 10 of the Decree also makes provision for public consultation to be organised by the licensing authority, but, other than specifying the release of a non-technical summary, does not specify the form of consultation. According to the Decree, the Environmental Licensing process is the responsibility of the "*Minister responsible for the environment*", exercised jointly with the Minister responsible for the relevant sector of the project (Article 11).

### **5.1.2.3 Decree No. 59/07 on Environmental Licensing**

Decree No. 59/07 on Environmental Licensing adopts provisions concerning requirements, criteria and administrative procedures related to Environmental Licences.

In terms of Section 2, Article 10, any activity requiring an EIA must acquire an Environmental Licence. Environmental Licences are "*issued by the entity responsible for environmental policy*" (assumed to be MinAmb).

Two types of Environmental Licences are required for activities listed in terms of Decree No. 51/04 on Environmental Impact Assessment: a Site Environmental Licence is acquired first and is needed for the establishment (construction) of a listed activity; while an Operation Environmental Licence is issued once compliance with all the requirements of the EIA has been demonstrated. The issuing procedures and contents of both licences are stipulated in the Decree.

### **5.1.2.4 Executive Decree No. 87/12 on Public Consultation for Projects Subject to Environmental Impact Assessment**

Executive Decree No. 87/12 defines and sets out the purpose of public consultation for projects that require EIA. While the need for public consultation following submission of the EIS to the relevant Ministry, before approval and issuing of an Environmental Licence, is prescribed in legislation prior to the promulgation of Executive Decree No. 87/12, this Decree provides a more detailed and extensive explanation of the objectives of and requirements for public consultation.

The new regulations include a list of definitions related to public consultation (Article 1), the objectives and purpose of public consultation (Article 2 and 3), as well as the composition of the committee to preside over public consultation and its role (Article 4 to 7). In Article 8, the requirements for information disclosure during public consultation is explained, including the role of the Non-Technical Summary. Administrative details such as the timeframe within which consultation must take place (5 – 10 days) and compilation of a public consultation report, are also set out in the regulations.

### **5.1.2.5 Executive Decree No. 92/12 on the Terms of Reference for Environmental Impact Studies**

Decree No. 92/12 sets out the terms of reference for the EIS and specifies its general content. This Decree establishes that the EIS must be compiled in terms of the legislation on EIA and should follow the guidelines contained in any relevant sector-specific standard terms of reference for EIS (currently being developed by MinAmb) once promulgated.

The Decree includes three annexes providing guidance on the information to be presented to the Ministry. Annex I is an application form for the project proponent to indicate which Environmental Licence is being applied for and Annex II provides a form for the provision of simplified preliminary project information. Annex III outlines the required content and structure for the EIS, but does not

provide details on the required content of each section. It is understood that such details are currently being developed by the MinAmb.

#### **5.1.2.6 Decree No. 1/10 on Environmental Audits (13/01/2010)**

Article 2 defines an environmental audit as a systematic and documented procedure for the management and objective evaluation of the organization and operation in terms of environmental protection. It also describes the purpose of an audit.

The Decree affirms that audited entities have to collaborate with the auditors, making available all documentation required to facilitate the audit by giving access to all the operations and facilities, reports on consumption of water, energy and machinery and to the personnel located on site (Article 11).

The Decree also establishes that the performance of the environmental audit does not exempt the audited entities from liability for environmental damage caused by activities that cause pollution or environmental degradation (Article 17).

#### **5.1.2.7 Decree No. 31/94 for the Establishment of the Principles to Promote Health, Safety and Workplace Conditions**

Article 1 of this Decree establishes the principles that promote safety, hygiene and health in the workplace, in accordance with precepts of paragraph 2 of Article 46 of Law 23/92 - Constitutional Law.

Item 1 of Article 4 (System's Goals) states that "*Safety and Health at work aims to implement their right to safety and health protection in the workplace in order to organize and develop their activities in accordance with the methods and standards established by legislation for employers and workers, as well as the competent organs of the state involved in this matter, comply with the duties established in this decree.*" Item 2 of the same article indicates that the application of the established measures will assure the minimum safety conditions with a view to minimize the risk of accidents and occupational diseases.

According to Article 9 of the Decree, employers are required to take necessary measures so that work is performed in an environment that allows the normal physical, mental and social development of workers that protects them against potential work accidents and occupational diseases.

#### **5.1.2.8 Executive Decree No.128/04 on Regulation on Safety and Health for Workplace Signage**

According to Article 1 of this Decree, this Regulation lays down minimum requirements for health and safety signage in the workplace, regulating rules on the use of signage, firefighting equipment, marking routes, etc.

#### **5.1.2.9 Presidential Decree No. 194/11 on Liability for Environmental Damage**

Decree No. 194/11 establishes strict liability for degradation of the environment. Aimed at preventing and repairing environmental damages, the Decree establishes that all activities capable of causing damage to the environment (Article 3, Item 1) are considered liabilities and are subject to regulation under the "polluter pays" principle.

According to the Decree, any entity responsible for pollution, by act of wilful misconduct or negligence, will also be held responsible for the clean-up and restoration of environmental damage. Responsibility will be held for losses and damages caused to the environment by way of compensation for damages and environmental recovery measures.

Whenever environmental damage occurs, according to Article 11, the operator shall promptly advise the competent authority of all relevant aspects of the situation and take the following measures:

- The proper steps to immediately control, contain, eliminate or otherwise manage the relevant pollutant elements and any other hazardous factors in order to limit or prevent additional environmental damage and adverse effects on human health or further deterioration of services; and
- The necessary repair measures.

Environmental quality standards in Angola are based on International Organisation for Standardization (ISO) standards which should be used as a guide for determining levels of pollution. Article 18 confirms the right of the public to request intervention when there is concern that environmental damage has taken place. In Article 21, the Decree also states that any individuals or legal entities which carry out activities that impose environmental risks shall have civil liability insurance.

#### **5.1.2.10 Water Law No. 6/02**

In terms of Article 68, Section 1 of the Water Law No. 6/02, *“the discharge of wastewater, wastes or other substances, and any activities that cause pollution or degradation of public water, is dependent on authorisation granted by the institution responsible for managing water resources ...”*

Pursuant to Article 22 and 24, water uses are classified as common (public) use, which refers to water taken from natural sources without any administrative approval, or private water use, which requires a license or concession in terms of this Law. Common (public) water uses have priority over private water uses. Articles 24 and 26 of the Act further clarify private uses that do not require a license or concession, which includes the use of water from lakes, lagoons, wetlands, springs, groundwater sources outside of protected areas and rainwater for domestic and agricultural use.

#### **5.1.2.11 Presidential Decree No. 261/11 on Water Quality**

Presidential Decree No. 261/11 serves as an addition to the national Water Law No. 6/02, dealing specifically with water quality. It establishes the roles within the Angolan governmental administration for overseeing water quality issues and addresses water quality standards relating to human consumption and wastewater. The decree also indicates the role of water quality monitoring along with the standard parameters for both drinking water and surface water, and emissions limits for wastewater discharge (in Annex VI).

According to the item 3 of Article 1, this law also regulates the control standards of wastewater discharge to waterbodies and soil, in order to preserve the quality of the aquatic environment and protect public health.

Article 13 of Chapter III (Protection of Waters Against Pollution of Discharged Wastewater) establishes that discharge of wastewater from a treatment facility to water and soil requires a licence to be issued by the MinAmb, in which discharge standards for mitigation or prevention of damage are set.

#### **5.1.2.12 Decree No. 40.040 on Protection of Terrestrial Fauna**

This Decree regulates the protection of wildlife, with the objectives of conservation and sustainable use without causing undue harm.

#### **5.1.2.13 Resolution No. 42/06 on the National Biodiversity Strategy and Action Plan**

To implement the recommendations from the United Nations Convention on Biological Diversity (UNCBD, ratified by the Resolution No. 23/97) the Angolan Government has approved, through Resolution No. 42/06 of July 26<sup>th</sup>, the National Biodiversity Strategy and Action Plan (NBSAP). This strategy aims to incorporate measures for the conservation and sustainable use of biological diversity, and the fair and equitable distribution of biological resources in favour of all Angolans, into policies and development programmes.

#### **5.1.2.14 Presidential Decree No. 190/12 on Waste Management**

Presidential Decree No. 190/12 establishes the rules concerning waste generation and disposal; discharge to water and the atmosphere; collection, storage and transport of any wastes (excluding radioactive waste). These rules aim to prevent or minimise negative impacts on people's health and the environment, without prejudice to the establishment of rules aiming to reduce, reuse, recycle, recover and dispose of waste. According to Article 2, this regulation applies to all activities that might generate wastes or are involved in waste management.

All private or public entities producing wastes should develop a Waste Management Plan. This plan is valid for four years.

#### **5.1.2.15 Territory and Urbanism System Law No. 3/04**

The Territory and Urbanism System Law No. 3/04 specifies that the use of land must comply with municipal or special territorial plans. The Act stipulates that the EIS must refer to these territorial plans.

#### **5.1.2.16 Cultural Assets Law No. 14/05**

The Cultural Assets Law No. 14/05 defines cultural assets as "*all material and immaterial goods that, due to their acknowledged value, must be subject to legal guardianship*". The Law establishes the duty of every citizen to "*preserve, defend and value the cultural assets*". Application for the demolition or destruction of cultural assets must be submitted to the Ministry of Culture.

#### **5.1.2.17 Resolution No. 52/08 on the National Strategy for the Implementation of UN Convention on Climate Change and Kyoto Protocol**

To ratify the Convention and the Protocol, Angola undertook to comply with the provisions in these two international legal instruments. The Strategy aims to establish the framework for intervention in Angolan legislation and the development of human skills and technology to help stabilise the emissions of greenhouse gases.

#### **5.1.2.18 Land Law No. 9/04**

The expropriation of land (privately owned or land awarded by the State), as a result of inundation, is regulated by Article 12 of the Land Law No 9/04 as well as Article 21 and Article 132 of the General Land Concession Regulation. Should community property be affected, the traditional authorities must be consulted and compensation must be paid according to Article 37 of the Land Law.

#### **5.1.2.19 General Labor Law No. 2/00**

In terms of the General Labor Law No. 2/00, employers are responsible to ensure a safe and healthy work environment. Article 53 and Article 84 prescribe the specific duties of employers. The Law also outlines the duties of workers to ensure their personal safety and the safety of others (Article 13/1).

Decree No. 31/94 further enforces the rights of workers to a safe and hygienic work environment by ensuring workers receive protective gear and equipment and regular information on workplace safety, hygiene and health related issues is provided to workers.

The Law also provides for the rights of workers to adequate housing (including their families) to ensure decent living standards (i.e. in accordance with hygiene and sanitation standards).

## 5.2 International Standards

### 5.2.1 IFC Performance Standards

The IFC PS's on Environmental and Social Sustainability, which were published in January 2012, are recognised as being the most comprehensive standards available to international finance institutions working within the private sector. The principles provide a framework for an accepted international approach to the management of social and environmental issues.

The eight IFC PS's are:

- **PS 1: Assessment and Management of Social and Environmental Risks and Impacts** underscores the importance of managing environmental and social performance throughout the life of a project. Performance Standard 1 requires the client to conduct a process of environmental and social assessment and to establish and maintain an Environmental and Social Management System (ESMS), appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. PS 1 aims to:
  - Identify and evaluate environmental and social risks and impacts of the project;
  - Adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment;
  - Promote improved environmental and social performance of clients through the effective use of management systems;
  - Ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately;
  - Promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them; and
  - Ensure that relevant environmental and social information is disclosed and disseminated.
- **PS 2: Labour and Working Conditions** recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. PS 2 aims to:
  - Promote fair treatment, non-discrimination and equal opportunity of workers;
  - Establish, maintain and improve the worker-management relationship;
  - Promote compliance with national employment and labour laws;
  - Protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties and workers in the client's supply chain; and
  - Promote safe and healthy working conditions and the health of workers; and avoid the use of forced labour.
- **PS 3: Resource Efficiency and Pollution Prevention** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. Thus, PS 3 aims to:

- Avoid or minimise pollution from project activities;
- Promote more sustainable use of resources (including energy and water); and
- Reduce project-related Greenhouse Gas (GHG) emissions.
- **PS 4: Community Health, Safety and Security**, recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. PS 4 aims to:
  - Anticipate and avoid adverse impacts on the health and safety of affected communities during the project life from both routine and non-routine circumstances; and
  - Ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities.
- **PS 5: Land Acquisition and Involuntary Resettlement**, recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. PS 5 thus aims to:
  - Avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs;
  - Avoid forced eviction;
  - Anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected; and
  - Improve, or restore, the livelihoods and standards of living of displaced persons.
- **PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**, recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. PS 6 aims to:
  - Protect and conserve biodiversity;
  - Maintain the benefits from ecosystem services; and
  - Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.
- **PS 7: Indigenous Peoples**, recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. PS 7 thus aims to:
  - Ensure that the development process fosters full respect for human rights, dignity, aspirations, culture and natural resource-based livelihoods of Indigenous Peoples;
  - Anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts;
  - Promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner;
  - Establish and maintain an ongoing relationship based on informed consultation and participation with the Indigenous Peoples affected by a project throughout the project's life-cycle;
  - Ensure the Free, Prior and Informed Consent of the affected communities of Indigenous Peoples when the circumstances described in this Performance Standard are present; and
  - Respect and preserve the culture, knowledge and practices of Indigenous Peoples.

- **PS 8: Cultural Heritage** recognizes the importance of cultural heritage for current and future generations. As such, PS 8 aims to:
  - Protect cultural heritage from the adverse impacts of project activities and support its preservation; and
  - Promote the equitable sharing of benefits from the use of cultural heritage.

PS 1 thus establishes the importance of (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project.

IFC PS's 2 through 8 present requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. Where social or environmental impacts are anticipated, the client is required to manage them through its ESMS consistent with PS 1.

The IFC PS's are matched with corresponding Guidance Notes that provide guidance on the requirements contained in the standards and on good sustainability practices to help clients improve project performance.

Note that PS 7 is not considered applicable to this Project.

## 5.2.2 World Bank/IFC Environmental Health and Safety Guidelines

The World Bank Environmental Health and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC's PS 3 on Resource Efficiency and Pollution Prevention<sup>7</sup>.

The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC and are generally considered to be achievable in new facilities at reasonable costs by existing technology. For IFC-financed projects, application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements.

When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The **EHS Guidelines for Construction Materials Extraction** include information relevant to construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite, as well as to the extraction of dimension stone. It addresses extraction activities supporting construction, civil works, and cement projects. The EHS Guidelines provide a summary of EHS issues associated with construction materials extraction that occur during the operational, construction, and decommissioning phases (e.g. air emissions, noise and vibration, water pollution, respiratory hazards, risks from uncontrolled access and land instability), along with recommendations for their management.

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<sup>7</sup> The information in this section has been sourced and modified from <http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines>.

**EHS Guidelines for Electric Power Transmission and Distribution** apply more to powerlines and are not deemed relevant to this project.

### 5.2.3 Equator Principles

The EP are a voluntary set of guidelines developed by leading financial institutions for managing environmental and social issues in project finance lending. The Principles require observance of the IFC PS's and the EHS Guidelines when developing projects in non-high income OECD countries. The guidelines provide an approach to determine, assess and manage environmental and social risk in project financing.

Financed projects must be undertaken "in a manner that is socially responsible and reflect sound environmental management practices". The intention is to ensure that projects are developed in a site specific manner that is socially responsible and reflects sound environmental management practices.

### 5.2.4 World Commission on Dams

The WCD was a global multi-stakeholder body initiated in 1997 by the World Bank and the World Conservation Union (IUCN) in response to growing opposition to large dam projects. The WCD established comprehensive guidelines for dam building (in the WCD Report, 2000) that are intended to protect dam-affected people and the environment, and ensure that the benefits from dams are more equitably distributed.

The WCD has developed five core values that must be applied to all decisions relating to water and energy development projects. If applied throughout the project cycle, these values will ensure improved decision-making processes that will deliver improved outcomes for all stakeholders. The WCD has grouped the core values under five principal headings:

- Equity;
- Efficiency;
- Participatory decision-making;
- Sustainability; and
- Accountability.

Seven strategic priorities (WCD SPs) and related policy principles have been identified by the WCD for future decision-making. These strategic priorities provide guidelines for achieving equitable and sustainable development through a process that successfully integrates social, economic and environmental considerations into decision-making on large dams and their alternatives (WCD, 2000).

The WCD SPs are:

1. **Gaining Public Acceptance** – This is essential for equitable and sustainable water and energy resources development. Effective implementation of this strategic priority depends on applying these policy principles:
  - Recognition of rights and assessment of risks are the basis for the identification and inclusion of stakeholders in decision-making on energy and water resources development;
  - Access to information, legal and other support is available to all stakeholders, particularly indigenous and tribal peoples, women and other vulnerable groups, to enable their informed participation in decision-making processes;
  - Demonstrable public acceptance of all key decisions is achieved through agreements negotiated in an open and transparent process conducted in good faith and with the informed participation of all stakeholders; and

- Decisions on projects affecting indigenous and tribal peoples are guided by their free, prior and informed consent achieved through formal and informal representative bodies.
2. **Comprehensive Options Assessment** - Explore alternatives for dams, needs for water, food and energy must be assessed and objectives clearly defined. Effective implementation of this strategic priority depends on applying these policy principles:
- Development needs and objectives are clearly formulated through an open and participatory process before the identification and assessment of options for water and energy resource development;
  - Planning approaches that take into account the full range of development objectives are used to assess all policy, institutional, management, and technical options before the decision is made to proceed with any programme or project;
  - Social and environmental aspects are given the same significance as technical, economic and financial factors in assessing options;
  - Increasing the effectiveness and sustainability of existing water, irrigation, and energy systems are given priority in the options assessment process; and
  - If a dam is selected through such a comprehensive options assessment process, social and environmental principles are applied in the review and selection of options throughout the detailed planning, design, construction, and operation phases.
3. **Addressing Existing Dams** - Optimise benefits from existing dams, address outstanding social issues and strengthen environmental mitigation and restoration measures. Effective implementation of this strategic priority depends on applying these policy principles:
- A comprehensive post-project monitoring and evaluation process and a system of longer term periodic reviews of the performance, benefits, and impacts for all existing large dams are introduced;
  - Programmes to restore, improve and optimise benefits from existing large dams are identified and implemented. Options to consider include rehabilitate, modernise and upgrade equipment and facilities, optimise reservoir operations and introduce non-structural measures to improve the efficiency of delivery and use of services;
  - Outstanding social issues associated with existing large dams are identified and assessed; processes and mechanisms are developed with affected communities to remedy them;
  - The effectiveness of existing environmental mitigation measures is assessed and unanticipated impacts identified; opportunities for mitigation, restoration and enhancement are recognised, identified and acted on; and
  - All large dams have formalised operating agreements with time-bound licence periods; where re-planning or relicensing processes indicate that major physical changes to facilities or decommissioning, may be advantageous, a full feasibility study and environmental and social impact assessment is undertaken.
4. **Sustaining Rivers and Livelihoods** – Avoid impacts on rivers, watersheds and aquatic ecosystems through good site selection and project design. Effective implementation of this strategic priority depends on applying these policy principles:
- A basin-wide understanding of the ecosystem's functions, values and requirements, and how community livelihoods depend on and influence them, is required before decisions on development options are made;
  - Decisions value ecosystems, social and health issues as an integral part of project and river basin development and prioritise avoidance of impacts in accordance with a precautionary approach;

- A national policy is developed for maintaining selected rivers with high ecosystem functions and values in their natural state. When reviewing alternative locations for dams on undeveloped rivers, priority is given to locations on tributaries;
  - Project options are selected that avoid significant impacts on threatened and endangered species. When impacts cannot be avoided viable compensation measures are put in place that will result in a net gain for the species within the region; and
  - Large dams provide for releasing environmental flows to help maintain downstream ecosystem integrity and community livelihoods and are designed, modified and operated accordingly.
5. **Recognising Entitlements and Sharing Benefits** – Recognise entitlements that improve livelihoods and quality of life, and that affected people are beneficiaries of the project. Effective implementation of this strategic priority depends on applying these policy principles:
- Recognition of rights and assessment of risks is the basis for identification and inclusion of adversely affected stakeholders in joint negotiations on mitigation, resettlement and development related decision-making;
  - Impact assessment includes all people in the reservoir, upstream, downstream and in catchment areas whose properties, livelihoods and non-material resources are affected. It also includes those affected by dam related infrastructure such as canals, transmission lines and resettlement developments;
  - All recognised adversely affected people negotiate mutually agreed, formal and legally enforceable mitigation, resettlement and development entitlements; and
  - Adversely affected people are recognised as first among the beneficiaries of the project. Mutually agreed and legally protected benefit sharing mechanisms are negotiated to ensure implementation.
6. **Ensuring Compliance** – Ensure public trust and compliance with applicable regulations, criteria and guidelines, and project-specific negotiated agreements is secured at all critical stages in project planning and implementation. Effective implementation of this strategic priority depends on applying these policy principles:
- A clear, consistent and common set of criteria and guidelines to ensure compliance is adopted by sponsoring, contracting and financing institutions and compliance is subject to independent and transparent review;
  - A Compliance Plan is prepared for each project prior to commencement, spelling out how compliance will be achieved with relevant criteria and guidelines and specifying binding arrangements for project-specific technical, social and environmental commitments;
  - Costs for establishing compliance mechanisms and related institutional capacity, and their effective application, are built into the project budget;
  - Corrupt practices are avoided through enforcement of legislation, voluntary integrity pacts, debarment and other instruments; and
  - Incentives that reward project proponents for abiding by criteria and guidelines are developed by public and private financial institutions.
7. **Sharing Rivers for Peace, Development and Security** – Ensure the use and management of resources to promote mutual self-interest for regional co-operation and peaceful collaboration. Effective implementation of this strategic priority depends on applying these policy principles:
- National water policies make specific provision for basin agreements in shared river basins. Agreements are negotiated on the basis of good faith among riparian States. They are based on principles of equitable and reasonable utilisation, no significant harm, prior information and the Commission's strategic priorities;

- Riparian States go beyond looking at water as a finite commodity to be divided and embrace an approach that equitably allocates not the water, but the benefits that can be derived from it. Where appropriate, negotiations include benefits outside the river basin and other sectors of mutual interest;
- Dams on shared rivers are not built in cases where riparian States raise an objection that is upheld by an independent panel. Intractable disputes between countries are resolved through various means of dispute resolution including, in the last instance, the International Court of Justice;
- For the development of projects on rivers shared between political units within countries, the necessary legislative provision is made at national and subnational levels to embody the Commission's strategic priorities of 'gaining public acceptance', 'recognising entitlements' and 'sustaining rivers and livelihoods'; and
- Where a government agency plans or facilitates the construction of a dam on a shared river in contravention of the principle of good faith negotiations between riparians, external financing bodies withdraw their support for projects and programmes promoted by that agency.

Five key stages and critical decision points have been identified as having a particularly strong influence on the final outcome. These key stages provide a framework within which decision-makers and stakeholder groups can be assured of compliance with agreed procedures and commitments. The first two key stages relate to water and energy planning, leading to decisions on a preferred development plan:

- Needs assessment: validating the needs for water and energy services; and
- Selecting alternatives: identifying the preferred development plan from among the full range of options.

Where a dam emerges from this process as a preferred development alternative, three further critical decision points occur:

- Project preparation: verifying that agreements are in place before tender of the construction contract;
- Project implementation: confirming compliance before commissioning; and
- Project operation: adapting to changing contexts.

The five key stages/decision points are supported by a set of key criteria that describe the processes required for compliance. The criteria are presented in the form of checklists for each decision point that provide a clear and open mechanism for determining whether the WCD's recommendations have been followed and the process can proceed to the next stage of planning or implementation.

The WCD strategic priorities are also matched with corresponding guidelines. These guidelines describe in general terms how to assess options and plan and implement dam projects to meet the WCD's criteria and to meet good practice. They are advisory tools to support decision-making and need to be considered within the framework of existing international guidance and current good practice.

### 5.2.5 World Bank Safeguard Policy of Dams

The WB Operational Policies (OPs) have been identified by WB as being particularly important in ensuring that Bank operations do no harm to people and the environment. There are 10 safeguard policies (WB SPs), comprising the Bank's policy on EIA and policies on: Cultural Property; Disputed Areas; Forestry; Indigenous Peoples; International Waterways; Involuntary Resettlement; Natural Habitats; Pest Management; and Safety of Dams.

*Operational Policy (OP) 4.37: Safety on Dams* requires that experienced and competent professionals design and supervise construction, and that the borrower adopts and implements dam safety measures throughout the project cycle. The policy also applies to existing dams where they influence the performance of a project. In this case, a dam safety assessment should be carried out and necessary additional dam safety measures implemented. OP 4.37 recommends, where appropriate, that Bank staff discuss with the borrowers any measures necessary to strengthen the institutional, legislative, and regulatory frameworks for dam safety programs in those countries.

## 6 Status of Compliance

This section describes the status of compliance of the project. It provides an overview or summary of compliance with the governance framework described in Section 5.

### 6.1 Host Country Legislation and Permitting

An ESIA was prepared by Angolan consultants – Holisticos - in order to fulfil a number of Angolan environmental regulatory requirements. The Draft ESIA, dated December 2010 was revised and finalised in December 2012 following a public hearing. The ESIA includes recent and sufficiently detailed baseline data. A number of relatively major changes to the project, notably placing of surplus material (rock) in the Kwanza River (to create a platform for a new access road) and relocation of the surplus materials dump, are neither described nor assessed in the ESIA.

Nevertheless, on the basis of this process and documentation, MinAmb awarded an Environmental Licence to ENE-EP on 26 April 2011, valid (for the project construction phase) until 25 April 2014. Following construction, ENE-EP will need to reapply to MinAmb for an operation phase Environmental Licence.

It is assumed that ENE-EP has paid the requisite license fee prescribed in the Environmental Licence, and is currently entitled to continue with construction. Since the Project was approved by the MinAmb and associated fees have been paid in full, the project is deemed to be in compliance with host country requirements for EIA, for the Project as described in ESIA documentation. The Environmental Licence and ESIA lists a number of conditions with which ENE-EP is expected to comply in the future.

In terms of the Water Law No. 6/02 and Presidential Decree No. 261/11 on Water Quality, ENE-EP may still need to obtain a licence to discharge polluted water, including wastewater from the proposed new sewage works. In addition, Presidential Decree No. 190/12 on Waste Management, requires that all private or public entities producing wastes must develop a Waste Management Plan.

Initially there was some uncertainty whether a small area of land near Terra Nova village, used for small-scale subsistence farming (and/or other areas), would be inundated. However, during the second site visit it was confirmed that this area will not be inundated.

Odebrecht (and ENE-EP) are obliged to ensure a safe and healthy work environment: Odebrecht has taken necessary measures to protect workers against potential work accidents and occupational diseases, and provides adequate worker housing, in compliance with the General Labor Law No.2/00.

### 6.2 IFC Performance Standards

The IFC PS's cover eight areas which are viewed as essential aspects of GIIP, i.e. good international environmental and social performance. Review of ENE-EP and Odebrecht's conformance with IFC PS's indicates the following:

- **PS 1: Assessment and Management of Environmental and Social Risks and Impacts:** An ESIA incorporating an EMP was compiled in 2010 by Holisticos. The ESIA "considered" the IFC PS's and in most respects the Project complies with PS1. A comprehensive baseline survey was undertaken and impacts were assessed, albeit in a somewhat perfunctory manner. However, placing of waste rock in the Kwanza River was not anticipated or assessed in the ESIA and is considered a gap. Similarly, cumulative impacts were not considered. Within Angola there may be a debate as to whether this is a Project or Government requirement/responsibility, though

PS1 is clear that the Project should consider cumulative impacts<sup>8</sup>. The EMP comprises five Sub-Programs as the vehicles for implementation of mitigation measures. Odebrecht has a comprehensive suite of HSE policies, plans and procedures in place, which are integrated into a system though it is not a formalised, e.g. ISO 14001 system. Grievance mechanisms need to be formalised and made known to the community, as well as to workers and sub-contractors. Social communication programs are focused on Cambambe village and compilation of a formalised Stakeholder Engagement Plan is recommended.

It is evident that Odebrecht has executed many similar or more complex hydroelectric projects and has the skills and capacity to ensure sustainable HSE management during construction. However, ENE's capacity is difficult to gauge and a program to build capacity and systems is recommended.

- **PS2: Labor and Working Conditions:** Odebrecht applies the laws of Angola prescribing working conditions. A formalised recruitment plan is implemented with respect to the 2 700 workers employed during the construction phase. The recruitment policy commits Odebrecht to the principles of equal opportunity and fair treatment. Preference is given to the employment of locals. Odebrecht does not make use of forced or child labour. The company has a collective agreement with unions that sets out working conditions. A grievance mechanism for workers and sub-contractors is not adequately defined, documented and communicated.

The ESIA notes that the (Category C) dormitory housing provided does not meet local requirements (taken to mean that accommodation for workers' families is not provided). Note however that this is not an explicit requirement of this PS. Employment contracts between Odebrecht and each employee allow for periodic family visits and based on legal opinions obtained by Odebrecht this arrangement is in compliance with Angolan labor legislation.

Odebrecht has an integrated HSE policy and a project-specific Occupational, Health and Safety (OHS) Plan/System, which have application during the construction and commissioning phases. A strong safety culture is evident, with particular emphasis on working at heights, which is one of the key occupational safety risks. The Daily Safety Dialogue (TDT) talks are an important vehicle for reinforcing safety culture.

- **PS3: Resource Efficiency and Pollution Prevention:** Odebrecht has compiled a number of plans that speak to this PS including Emergency Response and Rehabilitation; however there are a number of gaps. Treatment and disposal facilities in Angola are known to be inadequate and the fate of many (hazardous) wastes is uncertain. Odebrecht proposes to install an incinerator to deal with hazardous waste. Waste rock is not disposed of at waste rock dumps identified in the ESIA, but rather on the bank of and in the Kwanza River, the impacts of which have not been considered. A Waste Management Plan, including the investigation of various options for waste disposal/recycling, should be compiled.

Limited application of energy and water use efficiency principles is evident and the avoidance and prevention components of the mitigation hierarchy are underemphasised.

Cambambe Phase 2 will generate estimated emissions reductions of 759 223 t CO<sub>2</sub>e/year and a total of 5 314 564 t CO<sub>2</sub>e/year over a total crediting period of 7 years.

- **PS4: Community Health, Safety and Security:** Odebrecht has an integrated HSE policy as well as a project-specific OHS Plan/System, both of which have application during the construction and commissioning phases. The health and safety components have an occupational focus, with considerably less emphasis on local communities. A fully staffed clinic

<sup>8</sup> The debate regarding the responsibility for commissioning a Strategic Environmental Assessment (SEA) may have more merit.

provides medical services to workers and their families. Odebrecht's HSE Plan raises awareness about disease prevention, including HIV/AIDS and the Education and Environmental Awareness Sub-Program is intended to perform a similar function. Odebrecht ERP does not make provision for the involvement of local government agencies and communities in the case of an emergency. It also unclear if the resources are adequate to deal with an emergency situation and whether details of the plan are disclosed to external stakeholders. Access to the site is secure.

- **PS5: Land Acquisition and Involuntary Resettlement:** No resettlement is required for the project and there will be no physical or economic displacement. A small agricultural field near Terra Nova will not be inundated. Therefore, PS5 is not applicable.
- **PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources:** A detailed biophysical baseline is provided, although discussion of impacts is very brief and not sufficiently explored. Impacts on biodiversity and ecosystem services within the area to be inundated and the project footprint are largely unavoidable, although biodiversity impacts on the perimeter of the site can be managed. There is no Biodiversity Action Plan or Biodiversity Management Plan, and most efforts are or will be focused on rehabilitation. A number of species registered on Angola's Red List of Endangered Species and on the International Union for Conservation of Nature (IUCN) Red List occur in the area. A Biodiversity Management Plan aimed at identifying and implementing measures to reduce impacts and restore biodiversity and ecosystem services, should be compiled.

The series of rapids on the Kwanza River could be regarded as a unique ecosystem under threat from the cumulative impacts of the series of eight dams planned for this reach of the river. Cumulative impacts of the dams on the Kwanza River should be assessed prior to the development of any new dams and relevant mitigation measures implemented/retrofitted.

As regards provisioning ecosystem services, stakeholders should be engaged about the loss of Kiamafulo Bridge beach and consideration given to providing an alternative in future. Once the dam is full, Odebrecht will identify suitable alternative areas, and provide access. Rehabilitation may be more challenging than anticipated and Odebrecht should provide assurance that rehabilitation programs and budgets are adequate to achieve desired outcomes.

- **PS7: Indigenous Peoples:** This standard is not considered applicable to the Project.
- **PS8: Cultural Heritage:** It does not appear that a formal heritage assessment was undertaken as part of the ESIA, in accordance with GIIP standards and guidelines. The scale and nature of earthworks means that it generally difficult to avoid impacting cultural heritage in the area. If there are any, their relocation and compensation needs to be handled in an open and systematic manner. However, no known sites have been identified or will be affected. Odebrecht's Manual of Integrated Program Health, Safety at the Workplace and Environment – Sustainability, includes a procedure for management of heritage resources encountered during the removal of vegetation.

The IFC PS's are matched with corresponding Guidance Notes that provide guidance on the requirements contained in the standards and on good sustainability practices to help clients improve project performance. The existing Odebrecht management system and ENE's management system should be aligned with these guidelines to ensure full compliance.

### 6.3 Equator Principles

While the ESIA has been approved by the Angolan authorities and the project is largely compliant, the assessment documentation contains, and the site visit identified, a number of deficiencies in

reference to international standards. The EPs are underpinned by the IFC PS's, and so only limited comment on the EPs is provided. The notable deficiencies include the following:

- The impact identification and evaluation process is systematic and based on a Rapid Impact Assessment Methodology (RIAM), but is not considered to be comprehensive. Placing of waste rock in the Kwanza River (which is currently occurring on site and may be significant impact) was not anticipated or assessed in the ESIA and is considered a gap. Cumulative impacts were not considered;
- Labour and workplace health and safety impacts are not included or assessed in the ESIA, but It is evident that Odebrecht has the skills and capacity to ensure sustainable HSE management during construction;
- In some areas IFC PS's and EHS guidelines are mentioned but not consistently applied in the ESIA, and there is no system or audit trail which demonstrates that the EHS guidelines have systematically been incorporated into Odebrecht's management system;
- The EMP comprises five Sub-Programs as the vehicles for implementation. The Sub-Programs are in effect management frameworks, not detailed plans or procedures. However, the EMP and Sub-Programs are not Action Plans since they do not define specific responsibilities, outcomes, measurable events with performance indicators, targets and acceptable criteria;
- The Public Consultation and Disclosure Plan (PCDP) and stakeholder engagement may have satisfied Angolan requirements, but are considered deficient in terms of GIIP. Consultation during the ESIA was inadequate. No interim report (such as a Scoping Report) capturing issues and presenting proposed terms of reference was compiled or released. Early and prior disclosure to all parties did not occur, and was not sufficiently ongoing;
- A grievance mechanism for the community is not adequately defined, documented and disclosed; and
- The ESIA was not independently reviewed.

## 6.4 World Commission on Dams and World Bank Safeguard Policy for Dams

Notable deficiencies in respect of WCD Strategic Priorities Review and World Bank Safeguard Policy for Dams review requirements include the following:

- Consultation during the ESIA was inadequate, and no interim report (such as a Scoping Report, as prescribed by the WCD Guidelines) was compiled or released. The consultation process was transparent, but abridged and characterised by a lack of supporting documentation. Given that many communities were unaware of the project it is not possible to gauge public acceptance;
- Cumulative basin-wide impacts (especially arising from the 8 planned reservoirs on the Kwanza River), which could result in significant environmental and social impacts, are not considered;
- There is no documentation pertaining to negotiations on mitigation and benefit sharing mechanisms; and
- A dam safety assessment was not undertaken; however the risk of dam failure is considered low based on seismic reports as well as studies undertaken by Engevix to inform Engineering design. Dam design was outsourced to Stucky Engenharia and peer reviewed by Lombardi, which provides considerable assurance with respect to dam failure.

## 6.5 IFC EHS Guidelines

In some areas IFC PS's and EHS guidelines are mentioned but not consistently applied in the ESIA, and there is no system or audit trail which demonstrates that the IFC EHS guidelines have systematically been incorporated into Odebrecht's management system and procedures.

## 7 Conclusions

This review has shown that the Cambambe Project complies with host country legislation, but that additional work is required to make progress towards meeting international standards. Already, many gaps have been closed since release of the Draft ESDD; as such the Final ESDD reports fewer gaps and the ESAP is appropriately trimmed. Virtually none of the gaps and deficiencies is considered material, and can be addressed in the short to medium term and incorporated in conditions and covenants attached to loans.

The following high level observations and findings provide context and serve as a precursor to the overview of the key risks summarised:

- *Context.* The area which will be inundated is State-owned and largely devoid of inhabitants. Consequently many of the social issues typically associated with dams are absent or of limited consequence. The fact that this is an expansion, rather than a greenfields project, reinforces this observation. Neither physical nor economic displacement will occur. Most impacts and HSE management challenges can reasonably be expected to manifest during the construction phase, while the operations phase is far more benign and warrants less active intervention to manage impacts, but demands vigilant monitoring of risks.
- *Integrated management system:* One of the main principles of GIIP is a comprehensive integrated management system. Odebrecht has a comprehensive suite of HSE policies, plans and procedures in place, though it is not a formalised, e.g. ISO 14001 system. It is important that continuous improvement is maintained.
- *Management commitment:* A review of Odebrecht's corporate policies and procedures indicates a strong commitment to continually improving HSE management so as to meet GIIP. This commitment was confirmed during meetings with the Odebrecht's HSE management and evidenced in Odebrecht's prompt reaction to concerns and gaps identified on site and in the Draft ESDD.
- *Community relations:* ENE and Odebrecht have good relations with host communities and authorities, which have been built up over many years by ENE, and more recently by Odebrecht, through ongoing stakeholder engagement. Odebrecht has established forums for community consultation and Corporate Social Investment, notably in Cambambe village, driven mostly by the Chaleno Kiambote initiative which is aimed at community upliftment.
- *Safety culture:* A strong safety culture is evident, with particular emphasis on working at heights, which is the one of the key occupational safety risks. The Daily Safety Dialogue (TDT) talks are an important vehicle for reinforcing safety culture.
- *Labour:* Labour conditions on site comply with GIIP and collective bargaining agreements are honoured.
- *Health:* On-site healthcare facilities are considered adequate, and provision is made for evacuation where necessary.

Key conclusions, focusing on key risks for the project that specifically require additional assessment and management planning, include the following:

- *Assessment of environmental impacts:* An ESIA incorporating an EMP was compiled in 2010 by Holisticos and an Environmental Licence was awarded to ENE-EP on 26 April 2011, valid until 25 April 2014. In principle, this is consistent with international practice, which requires that environmental and social impacts be fully assessed and managed, and material changes be subjected to additional assessment and management planning. A Final ESIA was submitted in

2012, following the public hearing which was convened. A comprehensive baseline survey was undertaken and impacts were assessed, albeit in a somewhat perfunctory manner. Most impacts occur during the construction phase with very few operational impacts *per se*, other than those which persist from the construction phase. Since the Project was approved by the MinAmb, the ESIA is deemed to be in compliance with content requirements, but only for the Project as described in ESIA documentation. However the ESIA is deemed deficient in terms of GIIP, notably insofar as placing of surplus material (rock) in the Kwanza River (for an access road platform) and cumulative impacts are neither described nor assessed in the ESIA. PS1 requires that cumulative impacts are assessed by the Project, notwithstanding a debate within Angola about assigning responsibility for assessment of cumulative impacts to the State. These deficiencies undermine the ESIA and expose ENE to reputational and future legal risk. Failure to identify and mitigate impacts will place ENE at risk and perhaps lead to costly liabilities and rehabilitation costs.

- *Capacity and management:* The project governance structure is fairly standard: Odebrecht has been appointed as the engineering and construction managers, but ENE retains liability for ensuring environmental and social performance of the project, and will assume management of the project once operational. Odebrecht has a large, competent and suitably resourced HSE team and it is evident that Odebrecht has the skills and capacity to ensure sustainable HSE management during construction. It is difficult to gauge ENE's systems and capacity to manage HSE issues during operations and although ENE has advised that systems and capacity will be developed, it would be premature to make a definitive judgment as to the probable efficacy of these proposed systems. Failure to address the capacity issue may lead to growing tension between the past and new operational management cultures.
- *Disclosure and public acceptance:* As might be expected in a country which has only in the recent past emerged from a civil war, stakeholder engagement is still a relatively novel concept in Angola. Nevertheless, it is a requirement of GIIP. Consultation compliant with Angolan legislation did occur and a public hearing was convened prior to submission of the Final ESIA. However, consultation in the ESIA fell short of GIIP. Early and prior ("free, prior and informed") disclosure to all parties did not occur and was not sufficiently ongoing. If it did occur it was not suitably documented. Given that many communities were unaware of the project, as reported in the ESIA, it is not possible to gauge public acceptance of the project. Current engagement processes are somewhat narrowly focused.
- *Grievance mechanisms:* Grievance mechanisms, both for workers/sub-contractors and external stakeholders are not adequately defined, documented and communicated.
- *Waste management:* Management of waste on site, and in Angola in general, is a challenge. The fate of hazardous and metal residues is uncertain, and it is not clear where they will be disposed or to what extent third parties will be used.
- *Rehabilitation:* Surplus material has been used in multiple locations (e.g. as fill material for accommodation camps, stores, etc.). Rehabilitation may be more challenging than anticipated, although Odebrecht has indicated they are confident that they have sufficient financial resources and rehabilitation will be successful, although opportunities to commence sequential rehabilitation have not been taken. Delayed rehabilitation can increase liabilities and increase exposure to reputational risk.
- *Housekeeping:* While housekeeping isn't yet a significant risk there is evidence that housekeeping requires improvement, e.g. waste management and storage, management of run-off from refuelling areas and the cement wash bay could be improved. The recent appointment of an additional Environmental Control officer (ECO) is expected to improve housekeeping practices.

- *Dam safety*: A dam safety assessment was not undertaken; however the risk of dam failure is considered low. In addition dam design was outsourced and peer-reviewed, which provides considerable assurance with respect to dam failure.
- *Biodiversity*: A number of species registered on Angola's Red List of Endangered Species and on the IUCN Red List occur in the area, and will be affected by the project. However, there is no Biodiversity Action Plan or Biodiversity Management Plan, and most efforts are or will be focused on rehabilitation.

## 7.1 Corrective Environmental and Social Action Plan

Detailed actions and recommendations have been summarised into a Corrective ESAP, which is presented in Table 7-1 below and gives practical instruction on the requirements to address key deficiencies in the ESIA, EHS plans and procedures and their implementation. The table is split into Part 1: Required Actions (addressing key risks and issues that must be addressed), and Part 2: Recommended Actions (addressing additional gaps of lower risk).

SRK recommends that annual or bi-annual verification of the implementation of the EP and PS be undertaken by qualified and experienced independent environment and social experts.

**Table 7-1: Corrective Environmental and Social Action Plan**

<b>PART 1: REQUIRED ACTIONS</b>				
<b>#</b>	<b>Relevant Standard</b>	<b>Comment/Gap</b>	<b>Corrective Action</b>	<b>Indicators for Completion</b>
<b>KEY RISK: ASSESSMENT OF CUMULATIVE IMPACTS</b>				
22.	PS1, PS6, EP2, WCD SP4	<p>An Environmental Impact Assessment (EIA) incorporating an Environmental Management Plan (EMP) was compiled and an Environmental Licence was awarded to ENE-EP on 26 April 2011. A comprehensive baseline survey was undertaken and impacts were assessed, albeit in a somewhat perfunctory manner. Cumulative impacts were not considered.</p> <p>Some major changes to the project description were not described or assessed in the EIA, and some on-going changes are anticipated</p> <p>The series of rapids on the Kwanza River could be regarded as a unique ecosystem under threat from the cumulative impacts of the series of eight dams planned for this reach of the river. This is not discussed or assessed in the EIA. As the Kwanza River crosses four provinces, there is debate within Angola which suggests that central government is assigned the responsibility for assessing such cumulative impacts. However PS1 requires that the Project assesses cumulative impacts.</p>	<p>Incorporate a procedure in Odebrecht's EHS system which describes, assesses and discloses major project changes to stakeholders, authorities and the Lender Group.</p> <p>Assess cumulative impacts of the dams on the Kwanza River prior to the development of any new dams and implement/retrofit relevant mitigation measures.</p>	Project change procedure.
<b>KEY RISK: ASSESSMENT OF ENVIRONMENTAL IMPACTS</b>				
23.	PS1	Surplus material (waste rock) is not being dumped in locations identified in the Draft EIA. Of particular potential concern is surplus material being placed on the right bank of, and in, the Kwanza River, downstream of the proposed powerhouse in order to create a platform for the construction of a new road.	<p>Assess impacts of rock placement in the Kwanza River and submit to MinAmb for their consideration and guidance, through proposed procedure to assess project change.</p> <p>Implement recommendations of the assessment.</p>	Assessment of rock placement in the river.
24.	PS1	The assessment of transmission lines has been excluded from the EIA and associated impacts have not been assessed.	Assess impacts of transmission lines and any associated infrastructure. Implement recommendations of the assessment.	Assessment of transmission lines.
<b>KEY RISK: INTEGRATED MANAGEMENT SYSTEM</b>				
25.	PS1, EP3, EP4, EP5, WCD SP5, WCD SP6	<p>It is not possible to ascertain if the mitigation measures in the EIA and conditions of the Environmental License have been captured in Odebrecht procedures.</p> <p>There is no documentation pertaining to negotiations on mitigation or benefit sharing mechanisms.</p>	<p>Ensure that all mitigation measures identified in the EIA as well as conditions of the Environmental License and IFC EHS Guidelines are integrated into Odebrecht and ENE policies, plans and procedures. Demonstrate integration, e.g. in a Commitments Register.</p> <p>Include clear procedures for monitoring in the EMP, including criteria, indicators and measurable events against which implementation can be monitored</p>	Revised plans. Commitment Register (or similar document).
26.	EP9	Internal inspections of facilities are conducted by HSE staff on a weekly basis. Odebrecht is also committed to retaining independent and credible international HSSE consultants to verify monitoring reports underpinning semi-annual regulatory submissions and financial covenants.	Appoint qualified and experienced independent environment and social experts to verify monitoring information (and implementation of the EP and PS).	Appointment of specialists Independent audit reports.

27.	PS1	Odebrecht have recently developed a legal compliance register to be used as the basis of regular legal compliance reviews.	Undertake legal compliance review during annual audit. Revise legal compliance register to reflect any changes to legislative requirements.	Legal compliance audits
<b>KEY RISK: CAPACITY AND MANAGEMENT</b>				
28.	PS1, EP4.	<p>ENE reports that they have an Operations Manual with procedures addressing operations and maintenance, as well as a suite of HS instructions. However, ENE does not have an integrated management system addressing HSE matters. ENE has a SE department, though its capacity could not be ascertained. ENE's Dams Security and Observation department is responsible for addressing possible construction and infrastructure failure, and seismology.</p> <p>It is difficult to gauge ENE's systems and capacity to manage HSE issues during operations, recognising that there should be far fewer HSE challenges during this phase. ENE has advised that systems and capacity will be developed, but at this stage it would be premature to make a definitive judgment as to the probable efficacy of and/or confidence in these proposed systems.</p>	Undertake skills needs assessment for EHS&C team.	Skills needs assessment.
			Build ENE's HSE capacity, and provide assistance in developing suitable plans policies and procedures prior to handover of the facility to ENE.	Capacity building plan.
			Consider job shadowing now as a component of capacity building.	Placement.
			Review progress on ENE's HSE systems annually and into the first few years of operation.	HSE review report.
<b>KEY RISK: LAND ACQUISITION AND DISPLACEMENT</b>				
29.	PS5	Based on surveys of the area to be inundated undertaken by Odebrecht and Holisticos, no known physical or economic displacement will occur. Since there are a number of small subsistence fields in close proximity to the inundated area, it is possible that additional fields (some opportunistic) may be established in the area prior to inundation. To preclude later claims, the boundaries of the inundated area, confirmed absence of economic activity in this area and a policy which will not compensate new activities in this area, should be clearly communicated to local communities and stakeholders.	Review the area to be inundated to confirm no economic displacement. Inform stakeholders of the boundaries of the inundated area and cut-off date for determining the need for economic displacement.	Records of public disclosure regarding inundation and cut-off date for determining eligibility for compensation.
<b>KEY RISK: DISCLOSURE AND PUBLIC ACCEPTANCE</b>				
30.	PS1, EP5, WCD SP1	<p>Early and prior disclosure to all parties did not occur, and was not sufficiently ongoing. Documentation of the consultation process, e.g. comments and responses, is not comprehensive.</p> <p>An interim report (such as a Scoping Report, as prescribed by the WCD Guidelines) capturing issues and presenting proposed terms of reference was not compiled or released.</p> <p>Given that many communities were unaware of the project it is not possible to gauge public acceptance</p>	Develop and implement a more detailed Stakeholder Engagement Plan and ensure that it allows for adequate and on-going consultation with affected communities during and after construction and that all comments and responses are adequately documented.	Stakeholder Engagement Plan.
31.	PS2, EP5, WCD SP1	Engagement with local stakeholders, notably Cambambe village, is thorough, driven mostly by the Chaleno Kiambote initiative. However, engagement plans with the wider community and – at times – the region, are not formalised.	Compile a Stakeholder Engagement Plan, including identification and analysis of stakeholders, appropriate methods of engagement and a programme for such engagement.	Stakeholder Engagement Plan.
<b>KEY RISK: GRIEVANCE MECHANISM</b>				
32.	PS1, PS2, EP6	Odebrecht has a communication procedure which includes a grievance mechanism for workers and sub-contractors although these could be better defined, documented and communicated.	Develop and implement a more formalised grievance mechanism, separate from the suggestions procedure.	Internal grievance mechanism.

33.	PS1, PS5, EP6, WCD SP1	Though relationships and communication with most communities appear to be excellent, grievance mechanisms for external stakeholders (communities) are not adequately defined, documented and communicated.	Develop and implement a more formalised grievance mechanism for external stakeholders, not only targeting Cambambe village.	External grievance mechanism.
<b>KEY RISK: WASTE MANAGEMENT</b>				
34.	PS3, WCD SP2	Management of waste on site, and in Angola in general, is a challenge, although SRK is aware of some improved facilities, mostly established to service the Oil & Gas sector. A waste dump is currently being established (delivery of geofabric liners is awaited) in a former borrow pit, although the size of this facility and distance from work areas do not seem appropriate. Odebrecht advises that the design of the waste facility has been undertaken in line with local and international waste facility design standards. However, the design was not typical of most landfills seen by SRK. A solid waste management strategy has been developed by Odebrecht to address hazardous and non-hazardous waste during the construction phase. Recyclable wastes are separated although Odebrecht is uncertain who would be able to recycle these materials. Consequently many wastes are being stored on site, but their fate once construction concludes is uncertain. The fate of hazardous and metal residues is more uncertain, however Odebrecht plans to install facilities on site for the incineration of hazardous wastes.	Develop a Waste Management Plan including the investigation of various options for waste disposal/recycling. Demonstrate that the landfill design meets GIIP.	Waste Management Plan
<b>KEY RISK: REHABILITATION</b>				
35.	PS3,	Aside from being dumped, surplus material has also been used in multiple locations (e.g. as fill material for accommodation camps, stores, etc.). Rehabilitation may be more challenging than anticipated, although Odebrecht has indicated they are confident that rehabilitation will be successful and have a rehabilitation plan in place.	Ensure that rehabilitation programs and budgets are adequate to achieve desired outcomes. Commence sequential rehabilitation.	Revised Rehabilitation Plan.
<b>KEY RISK: HOUSEKEEPING</b>				
36.	PS1, WCD SP2	General "housekeeping" on site requires some attention e.g. waste management and storage, management of run-off from refuelling areas and the cement wash bay could be improved.	Ensure that environmental procedures for construction activities cover general "housekeeping" issues. Undertake regular inspections and implement corrective action immediately. Revise the EMP and Sub-Programs to include clear procedures for monitoring including criteria, indicators and measurable events against which implementation can be monitored. Ensure that procedures are in place to ensure implementation and monitoring of all requirements contained in the EIA, EMP and Sub-Programs, as well as IFC EHS Guidelines and conditions of the Environmental License	Revised EMP.

<b>KEY RISK: DAM SAFETY</b>				
37.	WB SP2	Emergency preparedness and response plans have been prepared, although these do not currently address dam failure. However, a procedure has been developed to establish emergency responses in the case of a dam failure. A specific dam safety assessment was not undertaken; however the risk of dam failure is considered low based on seismic reports as well as studies undertaken by Engevix to inform Engineering design. Dam design was outsourced to Stucky Engenharia and peer reviewed by Lombardi, which provides considerable assurance with respect to dam failure. The Angolan government is developing a national Emergency Response Plan which should address dam failure, although the status of this plan is unknown.	<p>Incorporate emergency response procedures in case of dam failure in the ERP, in consultation with external stakeholders.</p> <p>Communicate response procedures to all potentially affected stakeholders.</p>	Revised Emergency Response Plan
38.	WB SP2	It is not apparent that project construction and will be independently reviewed.	Conduct an independent review of project construction and operation.	
<b>RISK: BIODIVERSITY</b>				
39.	PS6	There is no Biodiversity Action Plan or Biodiversity Management Plan, and most efforts are or will be focused on rehabilitation. A number of species registered on Angola's Red List of Endangered Species and on the International Union for Conservation of Nature (IUCN) Red List occur in the area.	Develop a Biodiversity Management Plan aimed at identifying and implementing measures to reduce impacts and restore biodiversity and ecosystem services. The Biodiversity Management Plan must address protection of Red List species.	Biodiversity Management Plan.
<b>PART 2: RECOMMENDED ACTIONS</b>				
<b>KEY RISK: INTEGRATED MANAGEMENT SYSTEM</b>				
40.	PS1, EP3	Odebrecht has a comprehensive suite of HSE policies, plans and procedures in place, which are integrated into a system, though it is not a formalised, certified e.g. ISO 14001 system. It is important that continuous improvement is maintained.	Demonstrate continuous improvement of environmental performance.	Management review of system to demonstrate continuous improvement.
<b>RISK: EMERGENCY RESPONSE</b>				
41.	WB SP2	Emergency response plans exclude responses or assistance in the local community (notably Cambambe Village) although emergencies are considered unlikely to affect the community. Odebrecht is committed to providing adequate resources to deal with an emergency situation during construction and to participate in emergency response planning post-construction.	Revise the ERP in consultation with authorities and local communities.	Revised Emergency Response Plan.
<b>RISK: HERITAGE</b>				
42.	PS8	It does not appear that a formal heritage assessment was undertaken as part of the EIA, in accordance with international good practice standards and guidelines.	Undertake a more detailed heritage survey including consultation with relevant authorities and communities.	Heritage assessment.

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Darryll Kilian

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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