

# BACKGROUND INFORMATION DOCUMENT (BID)

## BAYNES HYDROPOWER PROJECT



### Background

In 1969 the Governments of Portugal and South Africa entered into an agreement on the first phase of development of the water resources of the Kunene River.<sup>1</sup> The agreement included a plan to develop a hydropower project at Ruacana, to be followed by a series of hydropower projects at Epupa and further downstream. This agreement resulted in the construction of three schemes during the 1970s, namely the Gove Dam in Angola, the Ruacana Hydropower Scheme located in Namibia approximately 170 km upstream of the proposed Baynes Site and the incomplete Calueque Water Scheme which facilitates water supply to the northern parts of Namibia.

In the late 1980s, SWAWEK (now NamPower) made forecasts about the increasing need for power in Namibia and began to consider the construction of a hydropower scheme in the Epupa area. In 1991, the governments of Namibia and Angola agreed to go ahead with the detailed technical and environmental investigations, with the studies commencing in 1992.

Between 1995 and 1998, NamAng<sup>2</sup> conducted a full Feasibility Study and EIA for the Epupa Project. During the study all possible hydropower development sites along the Kunene downstream of Ruacana were investigated, with the Baynes and Epupa Sites eventually selected as the more technically viable sites. Further work continued on these two sites, with comparisons made in terms of technical, social, and ecological aspects. The Feasibility Study concluded that the Epupa Site would be technically preferable (i.e. greater storage capacity), while the Baynes Site would result in far less ecological and social impacts as a result of a smaller inundated area, resulting in less destruction of habitat and natural resources, less water loss through evaporation, and significantly reduced human impact, such as loss of access to grazing, physical resettlement, and loss of grave sites. The Epupa Project would have been far more disruptive to the life of the local Himba<sup>3</sup> since it would require the flooding of a broad valley extensively used by farmers and herders. Opposition to the plans of a dam at the Epupa Site by local and international NGOs and the Himba, saw the project being shelved and caused the two governments to consider alternative power supply arrangements, such as a new 400kV power line built to supply Namibia with additional power from South Africa.

This BID provides:

- a brief background and introduction to the proposed Baynes Hydropower Project;
- an overview of the Techno-economic Feasibility Study for the Project;
- an introduction to and approach for the Environmental and Social Impact Assessment (ESIA);
- details of the Public Consultation and Disclosure Plan for the ESIA; and
- an invitation for public involvement throughout the ESIA.

For any information about this ESIA and the process to be followed, interested and affected parties can contact:

Ernst Simon at Urban Dynamics Africa (Namibia):

**Landline:** +264(61) 228-435

**Mobile:** +264(81) 124-5188

**E-mail:** ernst@udanam.com

Vladimir Russo at Holísticos (Angola):

**Landline:** + 244 222 006 938

**Fax:** +244 222 006 435

**E-mail:** holisticos@holicos.co.ao

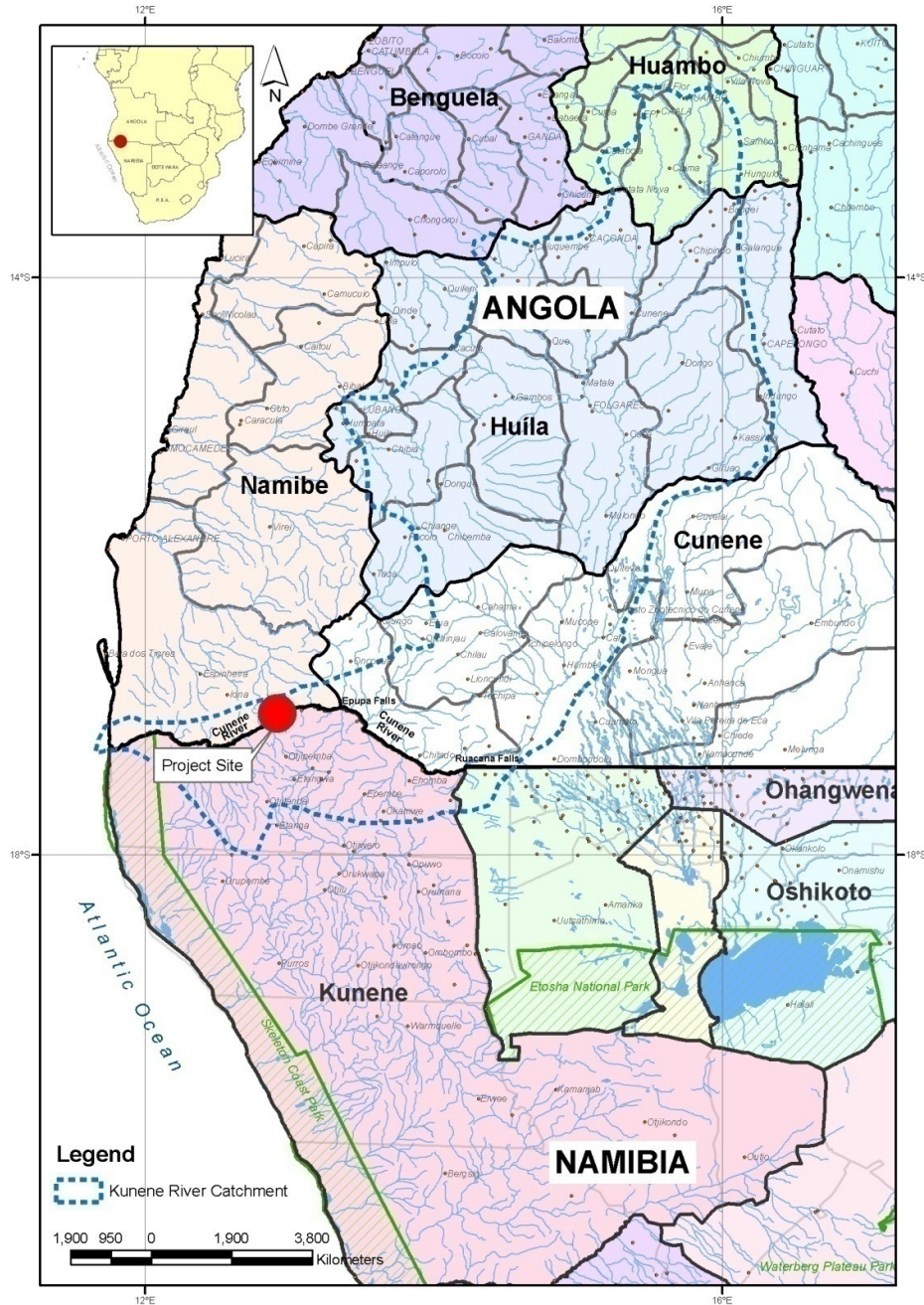
<sup>1</sup> For consistency purposes, the Kunene River (spelt "Kunene" in Namibia and "Cunene" in Angola) will be spelt Kunene in the English version of the ESIA and Cunene in the Portuguese version of the ESIA.

<sup>2</sup> NamAng was a consortium comprising Norconsult (Norway), SwedPower (Sweden), Burmeister and Partners (Namibia) and SOAPRO (Angola).

<sup>3</sup> The Himba (who share a common origin with the Herero tribe) are an indigenous pastoral and nomadic people found within the region. The Himba are also referred to as the Ova-Himba in Angola. For the purpose of this ESIA, this group will be referred to as interchangeably as the Himba/Ovahimba.

### Locality

The Kunene River Basin represents an area of 106 500km<sup>2</sup> (See Figure 1). The Kunene River has its source in the central region of Angola, near the City of Huambo. The river flows southwards towards the Angola/Namibia border before turning in a westerly direction to form the border between the two countries, flowing into the Atlantic Ocean. Figure 1 illustrates the locality of the Baynes Site on the Kunene River.



**Figure 1:** Locality of the Baynes Hydropower Project in Relation to the Kunene River Catchment.

## Current Proposal and Associated Studies

### *Introduction*

Over the past decade, local and regional power demand has increased, especially for mid-merit and peak electricity<sup>4</sup>. In 2007 the power demand and supply for the region stood at 50,000MW. This has necessitated the Permanent Joint Technical Commission (PJTC) on the Cunene River Basin to further consider the development of the Baynes Hydropower Project. Meanwhile other alternatives such as a coal fired power station at Arandis and the Kudu Gas Power Station in Namibia, as well as nuclear, solar, wave and wind power generation are also being considered. The PJTC appointed the Cunene Consortium, consisting of four Brazilian engineering companies, to revise the 1998 feasibility study of the Baynes Hydropower Project.

The PJTC appointed Environmental Resources Management (ERM), after an international tendering process, to independently conduct the Environmental and Social Impact Assessment (ESIA) in parallel and in close consultation with the techno-economic study.

The PJTC will ensure that the project (if it goes ahead) and the associated studies are developed on a bi-national basis with sharing of responsibilities, costs, and benefits between the two countries.

The main objectives of the techno-economic study and ESIA, although conducted independently from each other, are the following:

- to establish the feasibility of the Baynes Hydropower Project;
- to broaden the investigation into a possible improved role for Baynes as a mid-merit or peaking station by assessing an additional number of scheme configurations;
- to analyze and evaluate the technical, economic and environmental viability of the appropriate choices and, if viable;
- to undertake a feasibility level design and develop guidelines for an EMP for the detailed design, construction, operation and decommissioning phases of the Project.

## The Techno-economic Feasibility Study

### *Introduction*

The Techno-economic Feasibility Study commenced in June 2008 and was completed in November 2011. The Feasibility Study comprised 3 phases. The Phase 1 document reported on secondary data collected, gaps identified, and recommendations on studies to be carried out during Phase 2 and 3. Phase 2 concentrated on the alternative dam locations, while Phase 3 concentrated on the selected dam location and its feasibility and viability.

### *Alternative Sites*

The three alternative sites under consideration were all within a few kilometers of the original proposed Baynes Site. The three sites were selected to find the best technical, economic, environmental, and social solution in the Baynes Gorge that would not inundate the Epupa Falls. Three alternative dam wall heights were considered at each site, namely 540m 560m, and 580m above sea level. Water will fill the dam basin up to those heights. The selection of the optimal dam height depended on a number of criteria including: stored water capacity; structural and engineering considerations; constraints of construction and operation; and power generation options.

## *Alternative Configurations*

The Baynes Hydropower Project cannot operate in isolation. Thus, the Techno-economic Team considered the combined possible configuration of the existing plants along the upper-Cunene River. Six different scenarios aimed at achieving optimal use of the river flow were compared and considered.

Irrespective of the alternative selected, the dam could operate either as 1) base load<sup>3</sup>, 2) mid-merit peak load, 3) peak load or 4) a combination of these.

<sup>(3)</sup> *Base load, Mid-merit-, and Peak load Power Stations are defined as follows:*

- **Base Load** Power Stations supply load for the full 24 hrs.
- **Mid-merit** Power Stations supply for the peak and standard periods (daytime) and are basically started and stopped once a day during week days.
- **Peaking** Power Stations supply only for the peaking period i.e. 07h00 to 10h00 and 18h00 to 20h00 and are therefore typically started and stopped twice a day during weekdays.

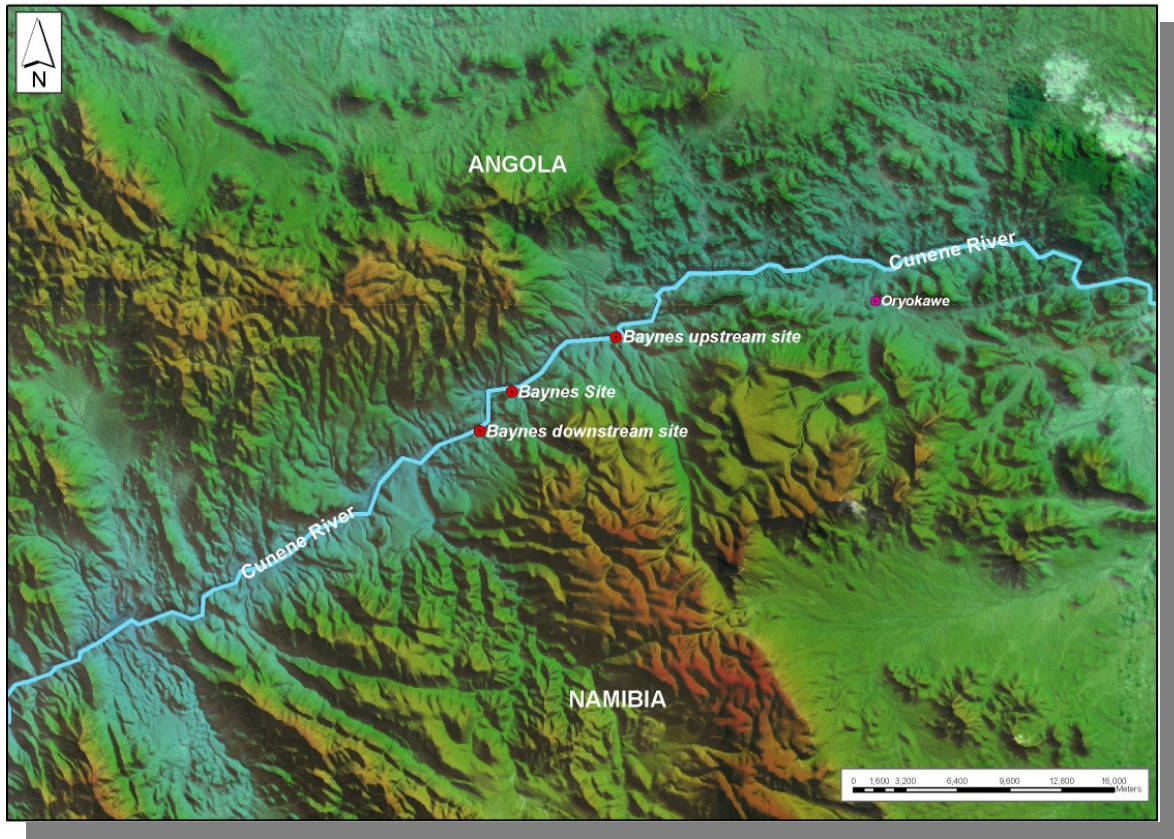


Figure 2: Locality of the Three Alternative Sites in the Project Area.

### Aspects Covered

The following aspects were considered by the Techno-economic Team:

- **Construction materials:** The dam wall will be constructed of rock, i.e. a rockfill dam. Various local sources of this rock were tested for suitability.
- **Geological surveys:** The Cunene Consortium carried out a series of new investigations to confirm the suitability of the three sites for the construction of a stable and safe reservoir.
- **Hydrology:** The hydrological flow series data for the Cunene River covered only 12 years of readings (1961 to 1972). These records were correlated with the data set for the Okavango/Cubango River, which contain 50 years of readings (1945-1994). Several analyses and data consistency checks were also made to verify and validate the flow data obtained from Ruacana.
- **Flood discharge studies:** An in-depth flood discharge study was conducted to fill the gaps in data. This involved obtaining and comparing long term flood records for the

Higher Zambezi River (considering appropriate deductions for the Kunene River) and consideration to the extenuating effects of the flood plains in the Cunene between Matunto and Roçados (Xangongo).

- **Flow regimen:** A hydrometric survey was carried out involving coordination with the PJTC to arrange for the reactivation of the flow-gauging network by the respective governments. A new flow-gauging station was established at the proposed Baynes Site to measure the net flows and solid discharge. Topo-bathymetric surveys in the inundated areas and river profile surveys were conducted.
- **Evaporation studies:** An evaporation map was completed for the area in order to determine water losses from the open reservoir.
- **Market studies:** Information such as long-term growth scenarios, power market studies, electrical distribution systems, pricing structures, power import and export details, energy availability and electric power structures in Southern and Eastern African Power Sectors were assessed.

### The Environmental and Social Impact Assessment (ESIA)

The ESIA process is a tool used to provide relevant, understandable, and objective information to demonstrate to decision makers, financiers and stakeholders in Angola and Namibia, what the consequences of the Baynes Hydropower Project will be in biophysical, social, and economic terms.

The Terms of Reference for this ESIA describes the Cunene River Basin as being very important environmentally for three main reasons:

- strategically important for both riparian states as a source of water and supplier of natural resources for human needs, irrigation, hydropower, and a growing tourism industry;
- one of the least impacted aquatic ecosystems in Africa with the Cunene Mouth being an important wetland that qualifies for registration as a Wetland of International Importance under the Ramsar Convention; and
- provides habitat for a number of known, and possibly yet to be discovered species of animals and plants- some of which are endemic to this river.

An EIA was undertaken for the Epupa/Baynes Hydropower Project in 1998. This study was deemed to be deficient in a number of respects; the main criticisms included a perceived inadequate social impact assessment and that an adversarial relationship

between the directly affected communities, local and indigenous NGOs and CBOs and the governments had developed. It is generally accepted that the Epupa option is controversial, but that Baynes might be a better alternative based on social and ecological criteria, including potential loss of tourism potential, sense of place, cultural heritage, natural resources, and human displacement.

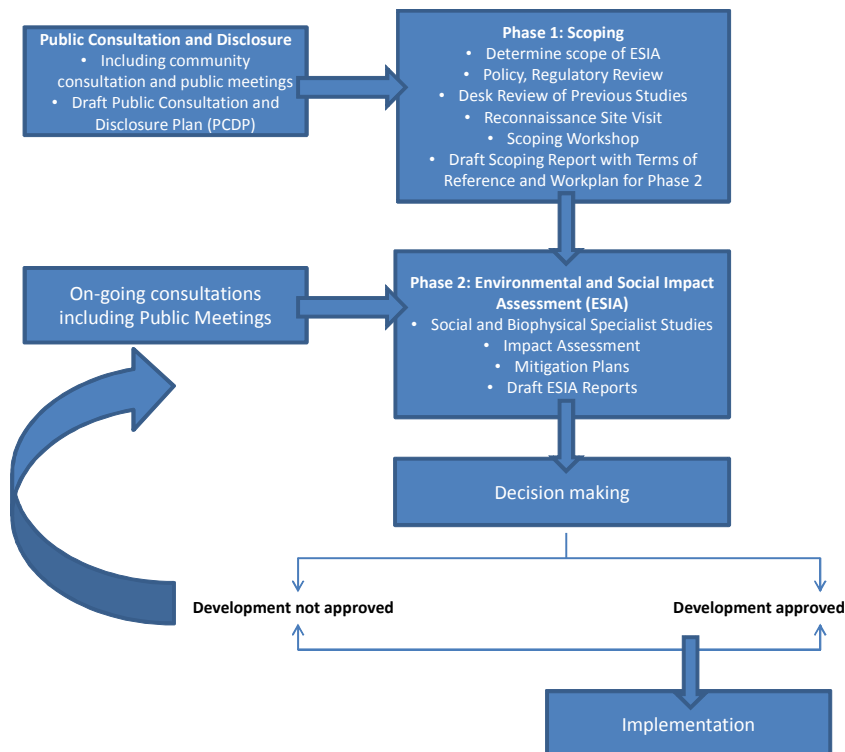
#### Aim

The overall aim of the ESIA is to produce an independent and robust Environmental and Social Impact Assessment Report that will satisfy best practice and applicable national and international requirements for the environmental and social assessment process and public consultation and disclosure.

#### Project components to be covered by the ESIA

The ESIA will cover the various aspects for construction and filling of the dam, installation of turbines and power plant infrastructure, and construction of the switch yard and ancillary structures. The ESIA will also cover the operation and maintenance of the dam and hydroelectric scheme. The PJTC will soon commission a separate Strategic Environmental Assessment (SEA) for the transmission lines linking the projects to the respective grids, as well as the access roads to the dam site and other associated infrastructure.

Figure 3: The Environmental Assessment Process.



### **Scope of Work**

This ESIA will, after having considered a broad range of strategic issues, focus primarily on in-project alternatives associated with the Baynes Site. The independent ESIA is to be conducted in two phases, namely:

- **Phase 1 - Scoping:** to include a thorough stakeholder engagement that will enable the ESIA Team to develop the Terms of Reference and Work Plan in preparation for Phase 2 of the study, and
- **Phase 2 - Environmental and Social Impact Assessment (ESIA):** to include a comprehensive evaluation of the impacts of the project on the environment, as well as the effects of the environment on the project.

The ESIA will not include the compilation of an EMP and it will therefore not provide an assessment of impacts of decommissioning. However, it will produce guidelines for what should be in the EMP, including the need to consider decommissioning impacts.

### **Legal Framework**

In line with the ToR, the ESIA will conform to the formal requirements of the Angolan EIA Regulations (Decree 51/04 on Environmental Impact Assessment established under Article 16 of the Environmental Framework Law (Law 5/98)) and the Namibian EIA Regulations (Environmental Assessment Policy (1995) established under the Environmental Management Act (2007)).

In addition, the ESIA will follow international guidelines and standards to ensure all issues are considered and managed in accordance with international good practice. The World Bank Safeguard Policies, the International Finance Corporation (IFC) Performance Standards, the World Commission on Dams (WCD) Strategic Principles, and the International Hydropower Association (IHA) Sustainability Guidelines and Protocols have all been considered in this ESIA.

### **External Review**

The SAIEA (Southern African Institute of Environmental Assessment) will act as an external reviewer of the ESIA. The SAIEA will review the ESIA and closely monitor process to ensure that it meets best practice and legal requirements.

### **Public Consultation and Disclosure Plan (PCDP)**

Public Consultation and Disclosure is considered one of the key tasks of the ESIA. A Public Consultation and Disclosure Plan has been drafted in line with IFC guidelines, which outlines how public disclosure and consultation will take place throughout the ESIA process and beyond.

The objectives of the PCDP are as follows:

- *To ensure that all stakeholders are included in the consultation and disclosure process;*
- *To ensure that initial information disclosure about the project is appropriate and comprehensible to non-technical stakeholders and the local population;*
- *To ensure that adequate and timely information is provided to project affected people and other stakeholders;*
- *To ensure that all stakeholders are given sufficient opportunity to voice their opinions and concerns;*
- *To ensure that these opinions and concerns influence project decisions;*
- *To ensure that regular feedback is provided to project-affected people; and*
- *To ensure that effective communication will continue during the construction and operational phases of the proposed project.*

The importance of effective and broad public participation in the ESIA process cannot be overstressed. The PJTC and the ESIA Team are committed to active and ongoing communication with all communities, organisations, groups, and individuals with an interest in the Baynes Hydropower Project.

### **How can you be involved?**

- *By attending public meetings that will be held during the ESIA process (these will be advertised in the press);*
- *By visiting the project website (<http://www.erm.com/BaynesESIA>);*
- *By telephonically contacting the ESIA contact persons for further information; and*
- *By reviewing the draft reports when you are invited to do so within the timeframes provided.*

Please ensure that you are registered on the project database by providing your contact details to the ESIA contact persons (see cover page). Registration will ensure that you receive ongoing communication about the ESIA process, including meeting invitations, project updates, and invitations to review the draft reports.

Please complete the attached **Registration & Comments Form** and send it to the contact provided on the cover page.

# BAYNES HYDROPOWER PROJECT

## REGISTRATION & COMMENTS FORM

*Please register me as an Interested and Affected Party (I&AP) to receive ongoing communication about the Environmental & Social Impact Assessment (ESIA) process and the proposed project:*

Name:	Telephone:
Organisation:	Fax:
Designation:	E-mail address:

Address:

Comments and issues of concern:

*Please submit the **Registration & Comments Form** to:*

Ernst Simon (Namibia)  
Urban Dynamics Africa  
P.O. Box 20837  
Windhoek  
Tel: +264 (61) 228-435  
Fax: +264 (61) 240-309  
Mobile: 264 (81) 124-5188  
E-mail: ernst@udanam.com

Vladimir.Russo (Angola)  
Holísticos, Lda. – Serviços, Estudos e Consultoria  
Urbanização Harmonia  
Rua 60, Casa 559  
Apartado 4, Caixa Postal 2426  
Benfica – Luanda  
Tel: + 244 222 006 938  
Fax:+244 222 006 435  
Mobile: + 244 914 446 289  
E-mail: holísticos@holísticos.co.ao