


# Baynes Hydropower Environmental, Social and Health Impact Assessment (ESHIA)

**FINAL SCOPING REPORT**

October 2009

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# *Baynes Hydropower ESHIA: Final Scoping Report*

October 2009

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Prepared by: ERM Southern Africa in association with EnviroDynamics, UrbanDynamics, IRDNC, Holisticos and Angola Research Institute

For and on behalf of
Environmental Resources Management

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Position: Partner

Date: October 2009

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*ACRONYMS*

| | |
|---|---|
| $^{o}C$ | Degrees Celsius |
| A-IP | Angola Research Institute |
| AC | Alternating Current |
| ACADIR | Associação de Conservação do Ambiente e Desenvolvimento Integrado Rural (Association of Conservation of the Environment and Integrated Rural Development) |
| ADRA | Adventist Development and Relief Agency |
| AMCO | Amalgamated Commercial Holdings |
| BCG | Bacillus Calmette-Guérin |
| BDOC | British Oceanographic Data Centre |
| BID | Background Information Document |
| BPA | National Bank of Angola |
| BPC | Banco de Poupança e Crédito (Savings and Loan Bank) |
| CAPEX | Capital Expenditure |
| CDM | Clean Development Mechanism |
| CER | Certified Emissions Reduction |
| CFM | Mocamedes Railway |
| $CO_{2e}$ | Carbon Dioxide Equivalent |
| CR | Critically Endangered |
| CRS | Catholic Relief Services |
| DD | Data Deficient |
| DDP | Dams and Development Project |
| DDT | Dichlorodiphenyl-trichloroethane |
| DiFD | Department of International Development |
| DPT | Diphtheria, Tetanus and Pertussis |
| DRFN | Desert Research Foundation of Namibia |
| DRIFT | Downstream Response to Imposed Flow Transformations |
| DSR | Draft Scoping Report |
| DTA | Democratic Turnhalle Alliance |
| DWA | Department of Water Affairs |
| EA | Environmental Assessment |
| ECB | Electricity Control Board |
| EDM | Electricidade de Mocambique |
| EF | Environmental Flow |
| EHS | Environment Health and Safety |
| EIA | Environmental Impact Assessment |
| EIS | Environmental Impact Study |
| ESMP | Environmental and Social Management Plan |
| EN | Endangered |
| ENE | Empresa Nacional de Electricidade |
| EPCM | Engineering, Procurement, Construction and Management |
| EPFI | Equator Principles Financial Institutions |
| ERM | Environmental Resources Management |
| ESHIA | Environmental, Social and Health Impact Assessment |
| EU | European Union |
| EPP | Emergency Preparedness Plan |

| | |
|---|---|
| Eskom | Electricity Supply Commission, South Africa |
| EW | Extinct in the Wild |
| EX | Extinct |
| FONGA | Forum of Local NGOs |
| FNDC | First National Development Corporation |
| FNOC | Fleet Numerical Oceanography Center |
| FSR | Final Scoping Report |
| GDP | Gross Domestic Product |
| GIS | Geographic Information Systems |
| GHG | Greenhouse Gas |
| GLOSS | Global Sea Level Observing System |
| GPS | Global Positioning System |
| GWH | Gigawatt hours |
| ha | Hectare |
| HHP | Hydropower Plant |
| HSAF | Hydropower Sustainability Assessment Forum |
| I&APs | Interested and Affected Parties |
| IEM | Integrated Environmental Management |
| IFC | International Finance Corporation |
| IHA | International Hydropower Association |
| IPP | Independent Power Producers |
| IRDNC | Integrated Rural Development and Nature Conservation |
| ISEC | International Society for Ecology and Culture |
| ISO | International Standardization Organization |
| IPP | Independent Power Producers |
| IUCN | International Union for the Conservation of Nature and its Resources |
| KWh | Kilowatt hours |
| L&FS | Life and Fire Safety |
| LR | Low Risk |
| MAPESS | Ministry of Public Administration |
| MAWF | Ministry of Agriculture, Water and Forestry |
| Meatco | Meat Corporation of Namibia |
| MET | Ministry of Environment and Tourism |
| MDG | Millennium Development Goals |
| MFMR | Ministry of Fisheries and Marine Resources |
| MINARS | Ministry of Assistance and Social Reintegration |
| MinEnv | Ministry of Environment |
| Minerg | Ministry of Energy |
| MME | Ministry of Mines and Energy |
| MOHSS | Ministry of Health and Social Services |
| MRLGHRD | Ministry of Regional and Local Government, Housing and Rural Development |
| MW | Megawatt |
| Nampower | Namibia Power Corporation (Pty) Ltd |
| NACOMA | Namibian Coast Conservation and Management Project |
| NE | Not Evaluated |
| NEPRU | Namibian Economic Planning and Research Unit |
| NGO | Non Governmental Organisation |

| | |
|---|---|
| NPRAP | National Poverty Reduction Action Program |
| NDP2 | Second National Development Plan |
| NDP3 | Third National Development Plan |
| OM&S | Operations Maintenance and Surveillance Manual |
| OPEX | Operating Expenditure |
| PCDP | Public Consultation and Disclosure Plan |
| PGNA | National Environmental Management Program |
| PIP | Public Investment Program |
| PJTC | Permanent Joint Technical Commission |
| PMF | Probably Maximum Flood |
| PNGA | National Environmental Management Programme |
| POP | Persistent Organic Pollutant |
| PPE | Personal Protective Equipment |
| PRS | Poverty Reduction Strategy |
| PSI | Population Services International |
| PSIP | Public Sector Investment Plan |
| RAP | Resettlement Action Plan |
| RDP | Rally for Democracy and Progress |
| ROD | Record of Decision |
| SADC | Southern African Development Community |
| SAP | Sustainability Assessment Protocol |
| SAPP | Southern African Power Pool |
| SARCCUS | Southern African Regional Commission for the Conservation and Utilisation of the Soil |
| SEA | State Secretariat for Water |
| SENSE | Socio-economic and Natural Sciences of the Environment |
| SG | Sustainability Guideline |
| STD | Sexually Transmitted Disease |
| STEM | Short-Term Energy Market |
| STI | Sexually Transmitted Infections |
| SWAPO | South-west People's Organisation |
| SWAWEK | South West Africa Water and Electricity Corporation |
| TB | Tuberculosis |
| TAAG | Linhas Aéreas de Angola |
| ToR | Terms of Reference |
| UN | United Nations |
| UNCCD | United Nations Convention to Combat Desertification in |
| UNDP | United Nations Development Program |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNFCC | United Nations Framework Convention on Climate Change |
| UNPFII | United Nations Permanent Forum on Indigenous Issues |
| USAID | United States Agency for International Development |
| USc | United States cents |
| VCF | Veterinary Cordon Fence |
| VOS | Voluntary Observing Ships |
| VU | Vulnerable |
| WCD | World Commission on Dams |
| WHO | World Health Organisation |

| | |
|---|---|
| ZESA | Zimbabwe Electricity Supply Authority |
| Zesco | Zambia Electricity Supply Corporation Ltd |

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# Introduction

# 1 INTRODUCTION

## 1.1 PURPOSE OF THIS REPORT

This Scoping Report has been compiled as part of the Environmental, Social and Health Impact Assessment (ESHIA) process for the proposed Baynes Hydropower Project for the Governments of Angola and Namibia, through the Permanent Joint Technical Commission (PJTC). (1) The ESHIA process is being conducted in accordance to the Angolan EIA Regulations (*Decree 51/04 on Environmental Impact Assessment* established under Article 16 of the *Environmental Framework Law (Law 5/98)*), the Namibian EIA Regulations (*Environmental Assessment Policy (1995)* established under the *Environmental Management Act (2007)*), the World Bank Safeguard Policies and the IFC performance standards. The main objectives of this report are to:

- present the ESHIA process and the relevant legislation that will be adhered to;
- present a description of the proposed project and the relevant alternatives;
- present the biophysical and socioeconomic conditions of the study area;
- present the issues raised during the initial public consultation;
- identify the environmental and social issues related with this project, on which the Environmental and Social Impact Assessment Study shall be focused; and
- present an outline of the terms of reference for the various specialist studies that will address the identified environmental and social issues.

The Scoping Report does not present the assessment of the environmental impacts or other definitive answers that shall be presented in the ESHIA Report.

## 1.2 BACKGROUND TO THE BAYNES HYDROPOWER PROJECT

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. The agreement included a plan to develop a hydropower project at Ruacana, to be followed by a series of hydropower projects along the entire river system. This agreement resulted in the construction of three schemes during the 1970's, namely the Gove Dam in Angola, the Ruacana Hydropower Scheme located in Namibia approximately 170km upstream of the proposed Baynes Site and the incomplete Calueque Water Scheme which facilitates water supply to the northern parts of Namibia as well as to irrigation projects inside Angola.

(1) The project proponent for the Baynes Hydropower Project is the governments of the Republic of Namibia and of Angola, represented by the Permanent Joint Technical Committee (PJTC). The PJTC was established in 1990.

In the late 1980s, SWAWEK (now NamPower) forecasts the increasing need for power in Namibia and began to consider the construction of a hydropower scheme in the vicinity of 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 (1) conducted a full Feasibility Study and EIA for the Epupa and Baynes Projects.

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 ones. 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 (ie 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 (2) 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.

## *1.3 PROJECT RATIONALE*

The rationale for the Baynes Hydropower Project for Angola and Namibia is provided in greater detail below.

### *1.3.1 Angola's Project Rationale*

*Need for Increased Electricity Generation in Angola*

The armed conflict in Angola limited this country's capacity to produce energy through hydropower dams, as the existing ones were affected by the war and during this period it was not possible to initiate new projects. Now, in times of peace, there is a huge demand for energy in Angola due to a number of reasons, namely:

- Increase of domestic demands due to the expansion of access to sources of energy, electrification of urban and peri-urban areas, increase of industrial, mining and housing projects;

(1) NamAng is a consortium comprising Norconsult (Norway), SwedPower (Sweden), Burmeister and Partners (Namibia) and SOAPRO (Angola).
(2) The Himba are an indigenous people who will be directly affected by this Project.

- Energy deficit from hydropower sources; and
- Urgent need for the development and use of water resources.

*Reduced Regional Electricity Supply Capacity*

The demand for energy supply in Angola has increased 36 percent in the period from 2001 to 2005 due to the economic growth registered in the country. Approximately 90 percent of the Angolan companies operate based on diesel generators due to the lack of continuous energy supply. Data from ENE (Angola's Energy Company) indicated a growth in energy consumption from 777.80 GWh in 1990 to 4,281.00 GWh in 2007.

Approximately 40 percent of the energy in Angola is supplied through thermal stations with a production of around 1,010 MW in 2007, which contributes to an increase of energy costs. This situation is affected by the fact that transmission lines are destroyed or not fully operational resulting in losses of energy during distribution. *Table 1.1* below indicates the main sources of energy generation in Angola, according to a study from the Angolan Catholic University (2007).

***Table 1.1 Main Sources of Energy Generation in Angola***

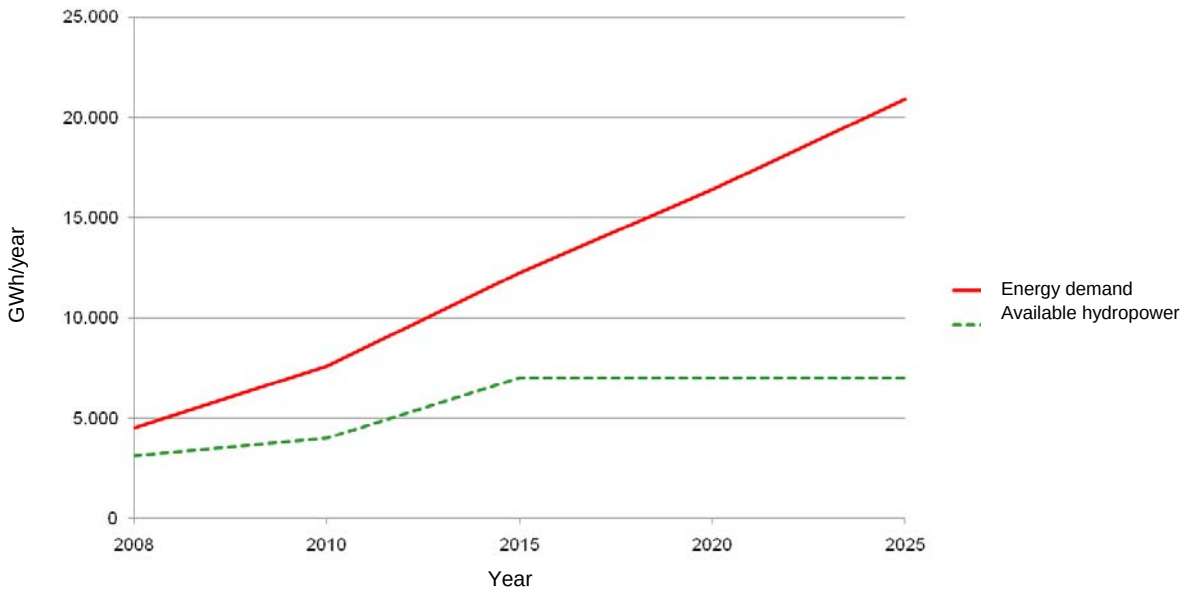
| Energy Source | Installed MW | Available MW | Percent |
|---|---|---|---|
| Hydro | 627.2 | 606.9 | 62.1 |
| Thermal | 382.4 | 211.5 | 37.9 |
| Total | 1,009.6 | 818.4 | 100.0 |

Source: Universidade Católica de Angola, 2007

The electricity sector is operated by the state utility company, Empresa Nacional de Electricidade (ENE). Three separate electrical systems are used to supply electricity throughout Angola. The current hydropower supply system is structured into four systems which are not interlinked and divided according to its geographic location, namely North, Centre, South and Isolated Systems. The North System where Capanda and Cambambe Dams are located provides 74 percent of the hydropower energy, the Centre 13 percent (Lomaum and Biópio Dams), the South 6 percent (Matala Dam) and the isolated systems 7 percent (Luachimo Dam).

As illustrated in *Figure 1.1*, between 2008 and 2025, the demand for energy in Angola (red line) will greatly surpass the availability of hydropower being generated (green line).

*Figure 1.1 Energy Demand in Angola vs. Availability of Hydropower*




Source: Permanent Joint Technical Committee

Amongst the 48 water basins in Angola the Kwanza river basin has the larger capacity to generate energy with a capacity of around 26,200GWh, thus a number of feasibility studies are currently being undertaken for other hydropower schemes downstream of Capanda. The Kunene River basin is also a potential source of energy through hydropower schemes with a potential of approximately 9,000GWh.

*Increasing Cost of Electricity*

The national electricity sector is currently facing a significant turning point in its history, largely due to the increase of demand as result of the high economic growth in Angola which has been generated by the large foreign investment, particularly by China. Currently there is no electricity surplus and the limitations and access to continuous sources of energy are evident throughout the country including Luanda. Those reliant on diesel generators as alternative sources of energy face high costs associated with diesel purchase and generator maintenance.

*Increasing Domestic Demand*

Since 2002, local and regional power demand has increased, especially for industrial and housing projects. The current Angolan electricity generation and distribution infrastructure is degraded and thus the losses are significant. The fact that the national grid is not interlinked also results in an inefficient energy generation scheme. This is also aggravated by the fact that a huge number of users do not pay for the electricity they use as result of the improper urban planning and lack of sufficient government control.

The national government is working towards linking the systems to create a national grid through the SAPP. Industry experts have suggested that Angola

need to ease state controls on electricity prices and offer incentives to attract private investment.

To address this energy demand, the Government is studying the possibility of several large projects which will result in an increase in energy generating and distribution capacity of the country. The rehabilitation of the Luanda distribution system has already started as well as the Gove Dam in Huambo. However, important investments are required to ensure that Angola's generating and distribution capacity meet its current and future needs. Angola plans to spend more than US$500 million over the next 20 years on building and restoring power facilities.

### *1.3.2 Namibia's Project Rationale*

*Need for Increased Electricity Generation in Namibia*

There are three main drivers that will necessitate Namibia to increase its domestic electrical generation capacity. These include:

- Reduced availably of electricity imports from neighbouring countries and the Southern African Power Pool (SAPP); (1)
- Increasing costs of electricity imports; and
- Increasing domestic demand. (2)

These three key drivers are discussed below.

*Reduced Regional Electricity Supply Capacity*

Approximately 43 percent of Namibia's electricity requirements is supplied by NamPower from local generation plants with the remainder comprising imports from the SAPP, particularly South Africa (Eskom) (3) which contributes approximately 50 percent of Namibia's electricity (see *Figure 1.2*). This was made possible through favourable Bilateral Agreements that have been in place for the past couple of decades.

Since 2006, Eskom's supply capacity has come under pressure as the South African domestic demand for electricity has surpassed Eskom's generation capacity, resulting in load shedding throughout the South African Development Community (SADC) region. As a result, Eskom is no longer able to provide electricity to Namibia during all load periods.

Historically during the 1960s and 1970s, South Africa's electricity demand grew at a rapid rate due to economic expansion. The Israeli/Arab war in 1973 and the resulting Arab oil boycott in the early 1970s resulted in a major

(1) SAPP is a multinational organisation that was created with the primary aim of providing reliable and affordable electricity to the consumers of each of the SAPP member countries, consistent with reasonable utilisation of natural resources and the effect on the environment.. Source: www.sapp.co.zw.
(2) Ninham Shand (Pty) Ltd, 2009.
(3) Eskom is the South African electricity public utility, established in 1923 by the government of South Africa in terms of the Electricity Act (1922).

turning point in global energy use and pushed Eskom into a period of increased growth and development of its generating capacity. During the 1980s and 1990s as a result of a slow-down in the South African economy and the advances in the efficiency of the new generating technologies being utilised, Eskom experienced a surplus of electricity. (1) This surplus enabled Eskom to undertake a major campaign to promote electricity usage and to encourage the electrification of the agricultural sector and attract high-use energy consuming industries (ie aluminium smelting) through competitively priced electricity. Eskom also increased the exportation of electricity to its neighbouring countries such as Namibia. During this period of continued economic growth and increasing levels of exportation, South Africa slowed down on its development of generation capacity and even mothballed some of its power stations. Demand eventually caught up with Eskom's supply capacity and, even though Eskom could provide sufficient electricity at full capacity, problems began to surface with shortfalls during unforeseen shut downs of generating infrastructure.

Even though measures have been taken to re-commission the previously mothballed power stations, South Africa needs to build new power stations that will come at a generating cost more in line with world prices. It is anticipated that it will take Eskom a number of years and it is unlikely that the electricity oversupply and associated low prices will exist in the future. As such Namibia will no longer benefit from this historical situation and will need to develop a more self sufficient energy solution while paying a higher price for electricity.

*Increasing Cost of Electricity*

The regional electricity sector is currently facing a significant turning point in its history, largely due to the South African energy crisis and its regional supply implications. With the surplus of inexpensive electricity no longer accessible, the cost of electricity will undoubtedly increase.

Components of the current Namibian electricity generation infrastructure such as the Van Eck Coal Fired station is expensive to operate and uses outdated, less efficient technology. These existing facilities cannot generate electricity at the prices of previous Eskom imports. The aging infrastructure also results in an increasing maintenance cost and the emissions associated with the outdated, less efficient technologies also increase the environmental and social costs.

From an economic perspective, the scarcity of electricity and the increasing demand have the potential to affect the market value of electricity. Whilst electricity prices are regulated, the trend toward the use of Independent Power Producers (IPPs) for future power generation in the SADC region may open the electricity market and reduce the extent to which prices are regulated. This may result in electricity prices becoming more receptive to

(1) Ninham Shand (Pty) Ltd, 2009.

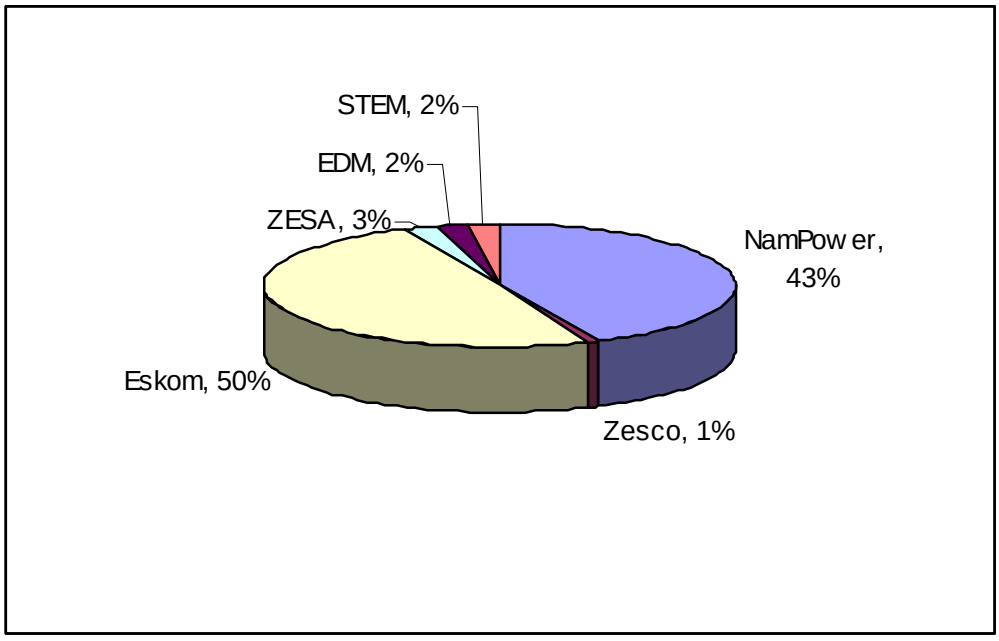
market forces such as changes in supply and demand. This can be seen in the changes in Short-Term Energy Market (STEM) (1) energy prices where prices jumped during the period 2001 to 2005 from approximately 0.4 USc/KWh to over 1.20 USc/kWh.

*Increasing Domestic Demand*

Over the past decade, local and regional power demand has increased, especially for mid-merit and peak electricity. (2) During 2008, NamPower generated and supplied 1,572 million kWh to the system. The remainder was supplied mainly by Eskom but also other power utilities. The various contributions by the electricity utilities for the period 2006 to 2008 are listed below and illustrated in *Figure 1.2*.

- Zimbabwe Electricity Supply Authority (ZESA);
- Electricidade de Mocambique (EDM);
- Short-Term Energy Market (STEM);
- Zambia Electricity Supply Corporation Ltd (Zesco);
- Electricity Supply Commission, South Africa (Eskom); and
- Namibia Power Corporation (Pty) Ltd (NamPower).

***Figure 1.2 Contributions to the Namibia Electricity System between 2006 and 2008***



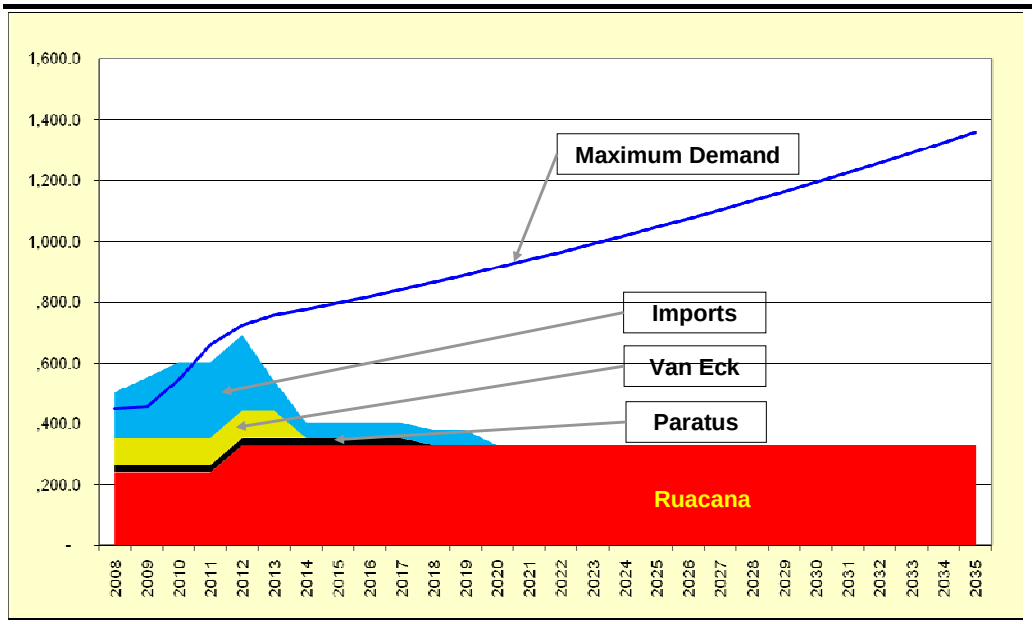

Source: Calculated from statistics in the NamPower Annual Report, 2008

The annual growth for energy is currently 4.6 percent while peak demand growth is 0.7 percent. NamPower has 393 MW of installed generation capacity

(1) STEM started live trading as of April 2001 and utilises the internet to conduct spot market trades of non-firm electricity contracts from IPPs. Source: www.eia.doe.gov/emeu/cabs/sapp.html.
(2) Base load, Mid-merit-, and Peak load Power Stations are defined as follows: i) Base Load Power Stations supply load for the full 24 hrs. ii) Mid-merit Power Stations supply for the peak and standard periods (daytime) and are basically started and stopped once a day during week days. iii) Peaking Power Stations supply only for the peaking period ie 07h00 to 10h00 and 18h00 to 20h00 and is therefore typically started and stopped twice a day during weekdays.

which drops to 144 MW during the dry season, when the run-of-river Ruacana hydro-electric power station is not in operation. The Ruacana hydro-electric power station is used to service peak demand during low flow periods in the Kunene River together with imports. If imports are not possible or insufficient, NamPower also needs to run Van Eck (coal) and Paratus (diesel) Power Stations to offset however at an extremely high cost. During 2007, the Namibian demand peaked at 450 MW, (1) revealing a considerable shortfall between the domestic demand and supply capacity as illustrated in *Figure 1.3*.

***Figure 1.3 Maximum Demand/Supply Graph (MW) for Namibia***

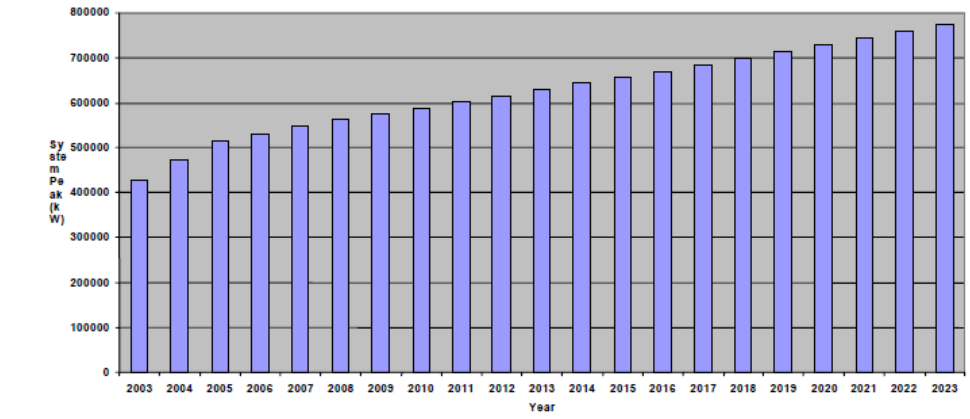



Source: Permanent Joint Technical Committee

*Figure 1.4* presents the 20-year electricity demand forecast determined by the Electricity Control Board (ECB), which further confirms that the gap between demand and supply will continue to widen in coming years. With Eskom's reduced contributions to the regional network, other SAPP countries will also become more concerned with looking after their domestic markets, leading to a general reduction of electricity imports and exports.

(1) Ninham Shand (Pty) Ltd, 2008.

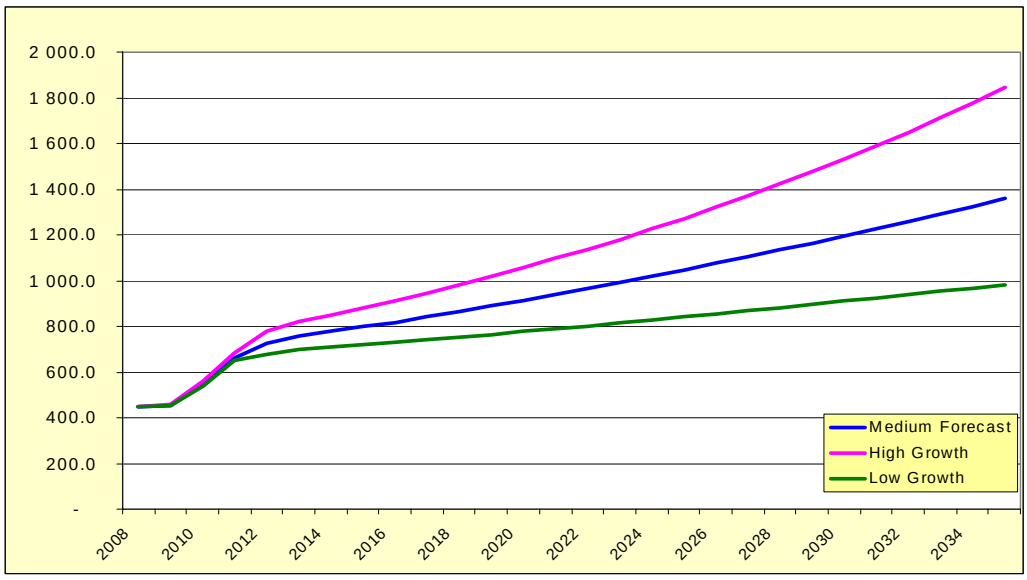
*Figure 1.4 Namibia's 20 Year System Peak Forecast*




Source: Electricity Control Board, 2006

Further to the supply and demand implications (see *Figure 1.5*) is the recent upturn in the global resources market. This economic growth is largely as a result of the industrial developments associated with the upsurge in Namibia's uranium exploration and mining and its supporting activities, but also due to continued urbanisation and industrial development. Mining and its associated ore processing activities are recognised as high electricity consumers. This upturn has been tempered somewhat by the current global economic downturn which has resulted in an expected delay in demand growth. However, as *Figure 1.5* illustrates, even if Namibia's economy slows down and results in the reduced demand or the low load forecast, additional electricity will still be required. (1)

*Figure 1.5 Energy Demand (GW) Forecast for Namibia*




Source: Permanent Joint Technical Committee

(1) Ninham Shand (Pty) Ltd, 2009.

In conclusion, there are two major implications for Namibia's economy should increased levels of electricity installation not occur [(1)]:

- As a result of the regional shortage and the likelihood of reduced importations, Namibia would not be able to supply enough electricity for its current economic activities, and
- As a result of the increase in the global resources market, particularly uranium and given Namibia's wealth of these natural resources, the country would not be able to take advantage of the current economic development opportunities.

## *1.4 STRATEGIC ALTERNATIVES TO MEETING THE ELECTRICITY DEMAND IN ANGOLA AND NAMIBIA*

The Angolan and Namibia Governments have considered a variety of alternatives to addressing their future energy demands. These alternatives include both non-renewable and renewable energies. The technical and economic feasibility, together with the environmental and social benefits have formed important inputs into planning the timing and use of various alternative technologies. A detailed discussion on the use of alternative technologies to meet future demands in both Angola and Namibia is contained in *Annex D*.

## *1.5 THE BAYNES HYDROPOWER PROJECT*

In order to establish the feasibility of using the Kunene River basin as a source of hydropower to meet both Angolan and Namibian future demand, the Governments of the Republic of Angola and the Republic of Namibia appointed a Permanent Joint Technical Commission for the Kunene River Basin (PJTC). A committee of the PJTC, known as the Baynes Committee has been established to act on behalf of PJTC, and is responsible for the administration and management of both the Technical and Economic as well as Environmental Feasibility of the Baynes Project. The PJTC appointed the Cunene Consortium, consisting of four Brazilian engineering companies, to undertake a techno-economic study 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 ESHIA in parallel and in close consultation with the techno-economic study. ERM is working with the support of other international technical partners and local Angolan and Namibian consultants including the Angola Research Institute (A-IP) Holisticos, Urban Dynamics, Enviro Dynamics and IRDNC.

(1) Ninham Shand (Pty) Ltd, 2009.

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 Angola and Namibia.

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

- establish the feasibility of the Baynes Hydropower Project;
- 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;
- analyse and evaluate the technical, economic and environmental viability of the appropriate choices, if viable; and
- undertake a feasibility level design and develop guidelines for an EMP for the detailed design, construction, operation and decommissioning phases of the Project.

## *1.6 THE BAYNES STUDY AREA*

The Kunene River is 1,100km long, it rises in the highlands of southwestern Angola (near Huambo) and flows southwards through the northern Kalahari for 660km to Calueque where it turns westward passing through the Namib desert for 390km forming the boarder between Namibia and Angola, before discharging into the Atlantic Ocean (see *Figure 1.6*).

The proposed ESHIA focuses on 340km of the lower Kunene River and its surrounds that stretches between Epupa Falls and the Kunene River mouth which is considered to be the Project's Area of Influence (see *Figure 1.7)*.

The Kunene River Basin is 106,560km$^2$ in size of which 92,400km$^2$ is in Angola and 14,100km$^2$ in Namibia and stretches from the Bie Plateau in the Angolan highlands to the northern extent of the Namib Desert and associated gravel plains bordering the Atlantic Ocean. The upper and middle reaches of the Kunene River are made up of an ancient drainage system, at its confluence with the Angola-Namibia border at the Ruacana Falls, the Kunene River enters a newer river channel formation created through backward erosion from the coast. From the Ruacana Falls, the Kunene River forms an east-west linear oasis of permanent freshwater across the northern Namib Desert before reaching the Atlantic Ocean. Approximately 80km west of the Ruacana Falls, the Kunene enters its gorge tract through the Zebra and Baynes mountains before reaching the 30 metres high Epupa Falls. After the falls the River enters a gorge that cuts through the Baynes Mountain range before spilling out into the Namib Desert where it is generally small in volume before flowing into the Atlantic Ocean at the Kunene River Mouth.

*Figure 1.6 Locality Map*

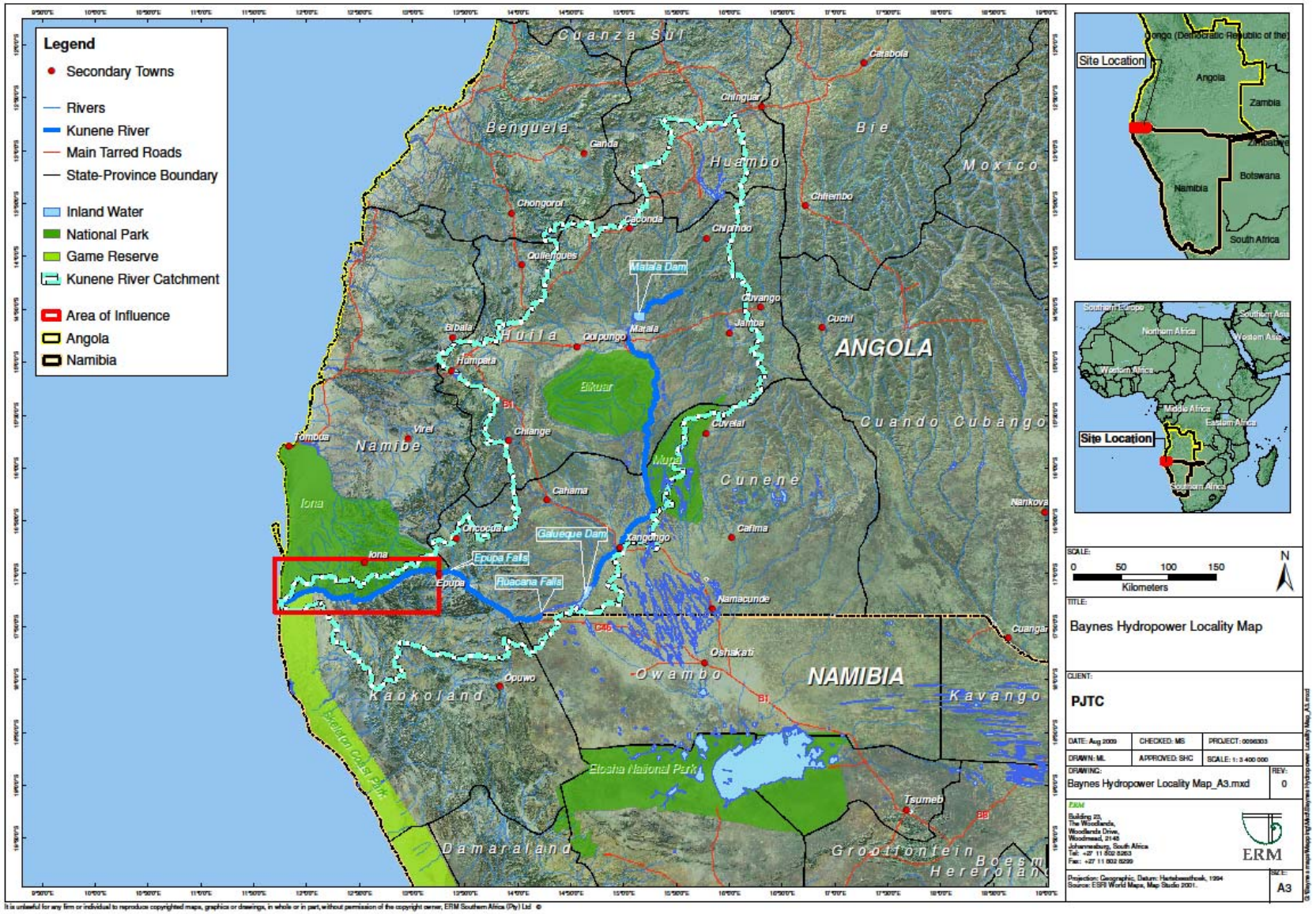
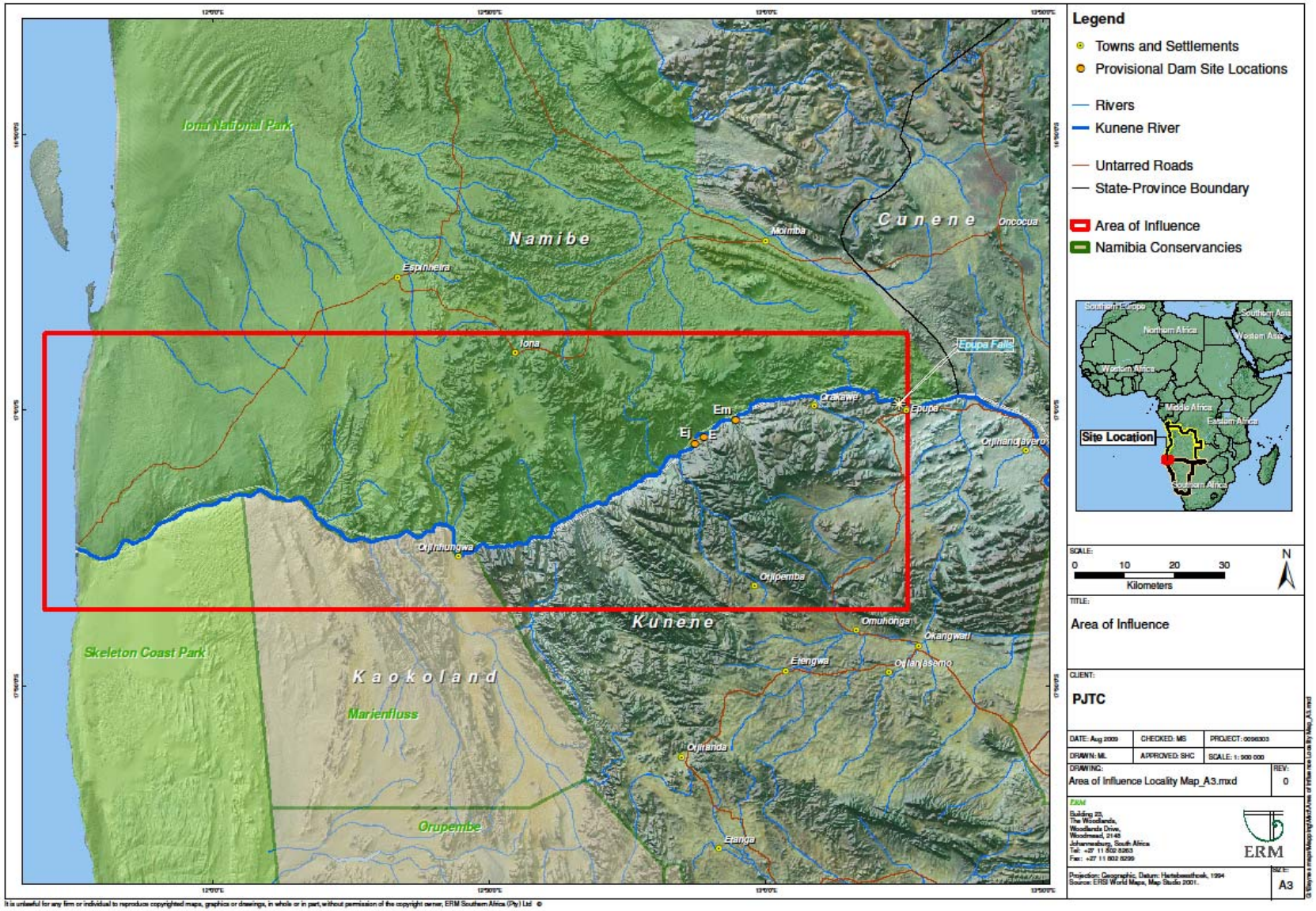


*Figure 1.7* *Area of Influence*



## 1.7 *ESHIA APPROACH AND METHODOLOGY*

The purpose of the ESHIA is to assess the direct and potential impacts of the project and project-related activities on the biophysical, ecological and socioeconomic environments, including public health. The ESHIA process consists of two phases:

- Phase 1 – Scoping; and
- Phase 2 – Baseline, Impact Assessment and Framework Environmental and Social Management Plan (ESMP).

The various steps for each phase are illustrated in *Figure 1.8* and discussed in detail below.

### *1.7.1 Phase 1: Scoping Phase*

Scoping is a formal requirement of an ESHIA in terms of both international best practice and in terms of the Angolan and Namibian legislation. It focuses the impact assessment by identifying the key issues for assessment and eliminating those that do not require intensive study. Ultimately, it helps define the terms of reference for the ESHIA, which will examine and report the full suite of impacts associated with the Baynes Hydropower Project.

The objectives of the Scoping Phase are to:

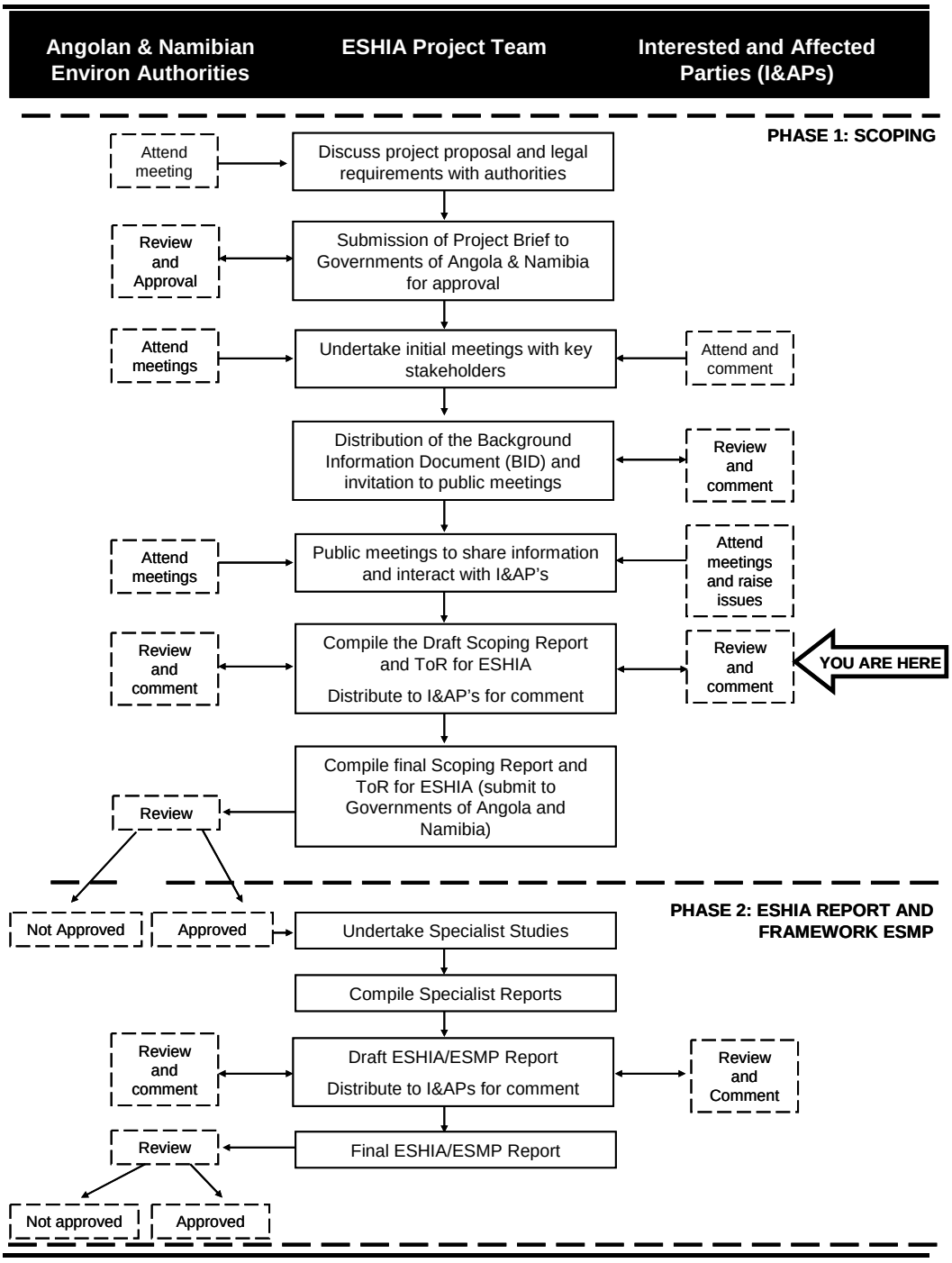
- present the proposed development to the I&APs;
- identify issues and concerns about the proposed development;
- identify potential fatal flaws; and
- identify and describe those issues which will require detailed investigation under Phase 2 of the ESHIA process.

The Scoping Phase consists of a number of activities including:

- consultation with relevant government departments;
- initial consultation with key stakeholders;
- advertising of public meetings;
- distribution of the Background Information Document (BID) to I&APs and invitations to public meetings;
- public meetings;
- production of the Draft Scoping Report;
- gathering public comment on the Draft Scoping Report; and
- submission of the Final Scoping Report to the environmental authorities.

All comments received from stakeholders during the ESHIA are include in this report and the details of the Public Consultation and Disclosure throughout the ESHIA process are included in the Public Consultation and Disclosure Plan (PCDP) included in *Annex A*.

*Figure 1.8 ESHIA Process*




### *1.7.2 Phase 2 – Baseline, Impact Assessment and Framework Environmental and Social Management Plan (ESMP)*

The issues raised during the Scoping Phase consultation have been used to develop the terms of reference for the specialist studies which will include the collection of more detail baseline data where necessary. Independent specialists will be appointed to undertake these studies. See *Chapter 9* for more detail on the terms of reference of the specialist studies.

Impacts will be assessed according to assessment criteria shown in *Box 1.1*.

***Box 1.1 Assessment Criteria Used to Define Significance***

**Extent**: A description of the scale of impact: ie on a scale limited to the immediate areas of development activity (the site); limited to within 5 km of the development; affecting the region as a whole; or occurring at a national or international scale.

**Duration**: A prediction of the lifetime of the impact: ie be short-term (0 to 5 years); medium term (5 to 15 years); long term (> 15 years, with the impact ceasing after the operational life of the development); or considered permanent.

**Intensity**: A description of the intensity (magnitude/size) of the impact: ie would it be high, medium, low or negligible (no impact). The specialist studies must attempt to quantify the magnitude of impacts and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

**Probability of occurrence**: A description of the probability of the impact actually occurring as: improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact would occur regardless of prevention measures).

**Legal requirements**: An identification and listing of the specific legislation and permit requirements (including relevant International Conventions and Agreements) with which the proposed project potentially could be expected to comply. Provide reference to the procedures required to obtain permits.

**Significance (importance)**: An assessment of the potential effects in terms of importance using all the above criteria. The importance is described as:

1. Low: an impact for which no mitigation is necessary;
2. Medium: an impact that requires effective mitigation;
3. High: an impact, which, if not mitigated, could stop the project from proceeding.

**Status of the impact**: A statement of whether the impact would be positive (a benefit), negative (a cost), or neutral.

**Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

The results of the specialist studies will be integrated into a Draft ESHIA Report and Framework ESMP.

The Draft ESHIA Report will provide recommendations on the mitigation of adverse impacts and the enhancement of positive impacts associated with the Project's activities. The mitigation measures will be translated in the Framework ESMP into clear, practical measures applicable to the local conditions and will be based on international best practice. Should the environmental licence be issued, the Framework ESMP will form part of the service providers' contractual obligations and will ensure that the Project is conducted and managed in an environmentally acceptable and responsible manner.

The Draft ESHIA Report and Framework ESMP will be disclosed to all stakeholders and a comments period allowed for stakeholder input. A Final ESHIA Report and Framework ESMP will be produced reflecting all the comments and inputs from I&APs and submitted to the Governments of

Angola and Namibia for consideration. Subject to approval of the report and issuing of the environmental license, all associated activities shall be governed by the Framework ESMP.

## *1.8 TIMESCALE OF THE ESHIA*

The time scale for the ESHIA is presented in the *Table 1.2* below.

***Table 1.2 Timescale of ESHIA***

| Phase | Dates (duration) |
|---|---|
| Phase 1 – Scoping | February 2009 – September 2009 |
| Phase 2 – Baseline, Environmental, Social and Health Impact Assessment and Framework Environmental and Social Management Plan (ESMP) | October 2009 – April 2010 |

## *1.9 STRUCTURE OF THIS REPORT*

The remainder of this report is structured as follows:

- *Chapter 2* provides an overview of relevant legislation and standards for Namibia and Angola as well as applicable international laws, agreements and standards and international best practice standards and guidelines;
- *Chapter 3* provides a description of the strategic alternatives to the Baynes Hydropower Project investigated;
- *Chapter 4* describes for a project description;
- *Chapter 5* describes the existing the physical and biological receiving environment;
- *Chapter 6* describes the existing socioeconomic receiving environment;
- *Chapter 7* describes the Public Participation Process undertaken;
- *Chapter* 8 provides a preliminary identification and evaluation of impacts;
- *Chapter 9* outlines the proposed Terms of Reference (ToRs) for the specialist studies (Phase 2);
- *Chapter 10* outlines the next steps and planned ESHIA program; and
- *Chapter 11* provides a list of references used for the Draft Scoping Report.

In addition, the report comprises the following annexes:

- *Annex A:* Public Consultation and Disclosure Plan
- *Annex B:* Records of Consultation Process

Chapter 2

# Applicable Legislation and Standards

# 2 APPLICABLE LEGISLATION AND STANDARDS

## 2.1 INTRODUCTION

This *Chapter* sets out the relevant legal and policy context in Angola and Namibia. It documents the environmental and social standards with which the Project will achieve compliance as well as the international standards that the Project will follow. Specifically, this *Chapter* summarises the following:

- Angolan and Namibian administrative and legislative organisations;
- the relevant Angolan and Namibian environmental and social laws and regulations deemed applicable to the Project;
- a discussion of multilateral environmental agreements and international standards to which Angola and Namibia are signatories and with which the Project must therefore comply; and
- consideration, where relevant, of other international conventions and standards with which the Project will also be consistent.

International treaties, conventions and protocols relevant to the Project relate to such issues as biodiversity, indigenous peoples, culture and heritage and operations and dam safety. In addition international organisations such as the International Finance Corporation (IFC) and the World Bank have developed environmental and social guidelines and standards that relate to both conducting an EIS as well as to the technical performance standards applicable to the Project.

## 2.2 ANGOLA

### 2.2.1 Government and Administration

Angolan legislation is issued at the national level through:

- *laws*, which are issued by the National Assembly;
- *decree-laws and decrees*, which are issued by the Council of Ministers; and
- *regulations (executive decrees), joint executive decrees and dispatches*, which are normally issued by a ministry or ministries.

The key ministries and other administrative organisations that are relevant to water sector in Angola are summarised briefly below.

*Ministry of Environment*

The Ministry of Environment (MinEnv) is responsible for the development and coordination of the country's environmental policy and the National Environmental Management Program. The Ministry, through the National Directorate for Prevention and Environmental Impact Assessment, is required to review environmental impact studies for all projects that may have social or

environmental implications, including those relating to the hydropower industry. The Ministry is also responsible for the administration and enforcement of many aspects of the *Environmental Framework Law No. 5/98* and its enabling legislation.

*Ministry of Energy*

The Ministry of Energy (Minerg) is responsible for the development of policies, planning, coordination, supervision and control of activities related to recovery and rational use of the national energetic resources. This institution is also responsible for the implementation of the energy-related policies, including atomic energy.

*State Secretariat for Water*

The State Secretariat for Water (SEA) is responsible for the development of policies, planning, coordination, supervision and control of activities related to recovery and rational use of the water resources, including the national and shared ones. This institution is also responsible for the management of the water basins in Angola as well as for the provision of water and sanitation.

*Ministry of Fisheries*

The Ministry of Fisheries is responsible for promoting fisheries cooperation through negotiation of international agreements, and the management of fisheries through licensing. The Ministry is also responsible for the administration and enforcement of the *Biological and Aquatic Resources Law Nº 6-A/04*. The Ministry has to be consulted before the implementation of any project pertaining to the exploitation of natural resources within inland waters. It also has responsibility over projects affecting artisanal fisheries in continental waters.

*Ministry of Public Administration, Employment and Social Security*

The Ministry of Public Administration (MAPESS) is responsible for implementation and administration of employment legislation and industry related and safety related laws and regulations.

*Ministry of Assistance and Social Reintegration*

The Ministry of Assistance and Social Reintegration (MINARS), is the government body responsible for managing and coordinating the implications of social policy related to more vulnerable groups of the population, ensuring their rights and promoting their development. MINARS is therefore central to any development that requires resettlement of households.

### 2.2.2 *Environmental and Social Legislation*

*Environmental legislation*

EIA and permitting legislation

The legislation currently applicable to carrying out EIAs in Angola is *Decree 51/04 on Environmental Impact Assessment. Decree 51/04* is established under Article 16 of the *Environmental Framework Law (Law 5/98)* which dictates that one of the principal instruments of environmental management is the Environmental Impact Assessment (EIA).

The main objective of the EIA is to gauge the effects which certain projects could have on the environment. *Decree 51/04* establishes the scope to be followed when carrying out environmental impact studies before projects requiring an EIA are approved by the appropriate competent body of the state, in this case the MinEnv. Under the terms of *Decree 51/04*, the required EIS should include, but not be limited to, the information set out in *Box 2.1*. In addition to this, there is a requirement (*Article 10*) for public consultation to be undertaken as part of the EIA. The public consultation and disclosure as outlined in *Article 10 of Decree 51/04* is limited to the disclosure of a non-technical summary of the EIA highlighting the key impacts of the project and proposed mitigation measures. The provisions allow for a public consultation period of five to ten days, at which time the public is allowed to present comments. It should be noted that the MinEnv, through the above-mentioned Directorate, has responsibility for promoting the public consultation process.

***Box 2.1 Requirements of Decree 51/04***

**The Environmental Impact Study shall contain the following data:**

- A description of Project (including a non technical description);
- A description of the activities to be undertaken;
- A general description of the environment at the site;
- The Environmental Impact Study; and
- All technological alternatives and location of the project, bearing in mind the probability of non-execution of the Project.

**When carrying out an Environmental Impact Study, the following technical measures shall be taken:**

1. An environmental analysis of the Project area of influence and the description and analysis of environmental resources and their interaction in the existing habitat, in order to characterize the environmental situation of the area before implementing the Project, taking into account:

a) the physical medium, the soil, sub-soil, waters, air and climate, highlighting the mineral resources, topography, types and capacities of the soil, water bodies, hydrological regime, marine currents, and atmospheric currents;
b) the biological medium and the natural ecosystems – fauna and flora, especially species identified as having an environmental quality, scientific and economic value, rare species and those threatened by extinction, and areas of permanent conservation;
c) the social and economic medium, use and occupation of soil, use of water and the social and cultural component, highlighting archaeological sites and monuments, history and cultures of the community, the interdependency between the local community, environmental resources and the potential future use of these resources.

2. Analysis of Project environmental impacts and alternatives, using means of identification, projection of magnitude and interpretation of the importance of probable relevant impacts, describing them as: positive or negative, direct or indirect, immediate or medium or long term, temporary or permanent impacts; degree of reversibility, cumulative and synergetic properties; distribution of social impacts and benefits.

3. Definition of mitigating measures to be taken against negative impacts.

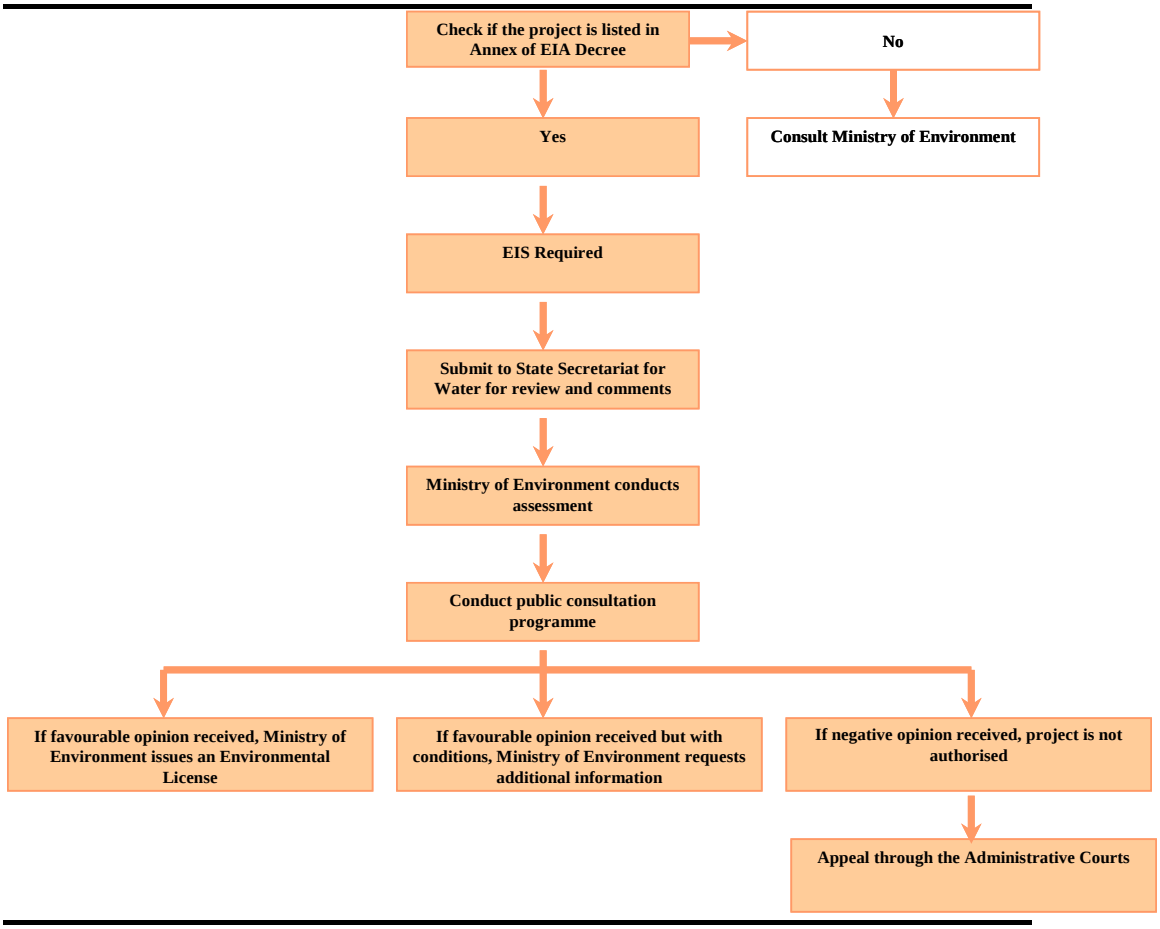
4. Drawing up of an observation and monitoring program of the positive or negative impacts, indicating the factors and parameters to be considered.

The requirements of the Angolan EIA approvals process is illustrated in *Figure 2.1*.

A new piece of Angolan legislation relevant to environmental permitting (*Decree 59/07: on Environmental Licensing*) came into force on 14 October 2007. This Decree provides additional legislation to supplement *Decree 51/04* on EIAs by providing guidance such as which project is subject to an EIA; what elements are to be included in an EIS; the nature and extent of public participation; the entity responsible for compliance with these legal requirements; and the EIA monitoring process. It also indicates that only Angolan registered environmental companies can submit EIS for approval.

Failure to comply with the *Environmental Licensing Decree* requirements may trigger the imposition of fines and other significant penalties, including closure of facilities and termination of activities.

*Figure 2.1 The Angolan EIA Submission and Approval Process*




*Environmental legislative requirements*

In consideration of environmental legislation, the following project related issues are considered:

- fisheries;
- biodiversity;
- discharges to water;
- emissions to air;
- noise and vibration;
- discharges to water;
- waste management; and
- natural heritage.

*Social legislation*

The following social legislation is applicable to the Project:

- Constitutional Law No. 23/92 of September 16;
- Land Law No. 9/04 of February 9; and
- Law on the Internal Waters, Territorial Sea and the Exclusive Economic Zone No. 21/92.

*Social legislative requirements*

In the consideration of social legislation, the following project related issues are considered:

- general environmental protection and social and environmental assessment and management systems;
- rights and duties;
- social issues under environmental law;
- access to fishing;
- access to agricultural land;
- loss of grazing;
- resettlement and displacement;
- cultural property;
- labor, working conditions and employment;
- economic activities; and
- community health and safety.

*Table 2.1* presents a summary of the most relevant and significant national legislation for Angola that may apply (based on current understanding) to the Project.

***Table 2.1 Summary of Relevant Angolan Environmental and Social Legislation***

| Issue | Applicable Legislative Instrument |
|---|---|
| **Environmental** | |
| Discharge to Surface Water (fresh and marine) and Groundwater | • *Law No. 6/02 - Water Law*<br>• *Decree Law No.146/75 Concerning Water, Beaches and Shore pollution* |
| Waste Management | • *Environmental Framework Law (No. 05/98)*<br>• *Resolution 41/01 of 21 December 2001*<br>• *Resolution No. 22/01* |
| Fisheries | • *Law No. 21/92 - Law on the Internal Waters, Territorial Sea and the Exclusive Economic Zone*<br>• *Law 6-A/04, Biological Water Resources Law*<br>• *Fisheries Act, No. 20 of 1992* |
| Biodiversity | • *Environmental Framework Law 1998*<br>• *Resolution No. 23/97 (ratifying the Convention on Biological Diversity)* |
| Natural Heritage | • *Environmental Framework Law No. 5/98* |
| Noise & Vibration | • *Environmental Framework Law No. 5/98* |
| **Social** | |
| General Environmental Protection and Social and Environmental Assessment and Management Systems | • *Article 12 of the Constitution (Part I)* |
| Rights and duties | • *Article 24 of the Fundamental Rights and Duties (Part II)* |
| Social Issues under Environmental Law | • *Environmental Framework Law 1998 (5/98)*<br>• *Article 5 (Aims and Measures)*<br>• *Article 10 (Public Consultation)*<br>• *Article 15 (Location of Infrastructures)* |

| Issue | Applicable Legislative Instrument |
|---|---|
| Access to fishing | • *Law No. 21/92, Law on the Internal Waters, Territorial Sea and the Exclusive Economic Zone*<br>• *Executive Decree No. 33/98*<br>• *Resolution No. 17/90 – Angola has ratified the UN Convention on the Law of the Sea* |
| Resettlement and displacement | • *Angolan Constitution - Law No. 23/92 of September 16,2002*<br>• *Law 23/92*<br>• *Land Law No. 9/04 (General Land Law)*<br>• *Ruling No. 37/95*<br>• *Decree 1/01*<br>• *Decree 79/02 of 6th December that regulates the Decree 1/01*<br>• *Instructive 01/GABMINARS/2002*<br>• *Resolution 1/91* |
| Cultural Property | • *Ruling No. 80/76 - Preservation of Heritage Sites*<br>• *Joint Executive Decree No. 46/91* |
| Labor, Working Conditions and Employment | • *General Labor Law No. 2/00*<br>• *Executive Decree No. 40/86*<br>• *Resolution No. 5/01*<br>• *Decree No. 20/82 (Angolanisation Decree)*<br>• *Decree No. 31/94 on the System for Health, Safety and Hygiene at Work*<br>• *Decree No. 5/95 on the employment of non resident of non-resident foreign workers in Angola*<br>• *Decree No. 6/96 on General Regulations for the Hygiene and Safety at Work Services.*<br>• *Decree on General Regulations governing the Industrial Accident Prevention Committees (IAPC) No. 21/98* |
| Economic Conditions | • *Dispatch 127 National Assembly Law 1/04*<br>• *Law No. 10/88 Law of Economic Activities*<br>• *Law No. 21-B/92*<br>• *Ruling 80* |
| Land Issues | • *Land Law (nº 9/04 of November 9)* |
| Local Authorities | • *Local Municipalities Act, No. 17 of 1999* |

### *2.2.3 Development Policies and Plans*

*National Development Planning*

The development policies for Angola at a national level are outlined below in *Box 2.2*.

*Box 2.2 Key National Development Plans*

**Angola 2025: Long-Term Strategy (*Estratégia de Longo Prazo*)**
This strategy document reviews the significant challenges in Angola (very low human development, very weak economic situation, institutional instability, lack of health and education services, regional inequality etc) and establishes strategic options up to 2025. The plan considers the possible growth of various sectors and key activities to realize this growth. The strategy has been drafted and is being revised to include stakeholder aspirations.

**Strategy to Combat Poverty (2003)**
The government of Angola has developed its strategy to combat poverty following the reconstruction process and national development, which has commenced. The global objective focuses on improving conditions of the Angolan citizens, in particular those who are vulnerable, by motivating them to actively participate in the social economic development process.

**National Biodiversity Strategy and Action Plan (2006)**
The government of Angola approved this strategy (*Resolution No. 42/06 of 26 July*) to guarantee the conservation and sustainable use of biological diversity components that enable the fair and equitable sharing of the benefits of the use of biological resources. The objective of the strategy is to incorporate measures for the conservation and sustainable use of biological diversity and fair and equitable sharing of biological resources into development policies and programs for the benefit of all Angolans.

**National Environmental Management Program (2009)**
The Ministry of Environment (MinEnv), with assistance from United Nations Development Program (UNDP) has completed a National Environmental Management Programme (PNGA) as part of a national process of combating poverty. The project has five strategic sub-programs, defined as:

1. Promotion of Intersectoral Coordination;
2. Protection of Biodiversity, Flora, Terrestrial and Marine Fauna;
3. Ecosystem Rehabilitation and Protection;
4. Environmental Management
5. Environmental Education, Information and Awareness

A series of themed papers was published in draft in June 2005. Of these development plans, the Strategy to Combat Poverty has been the only plan available for review.

*Provincial Development Plans*

At the provincial level, each provincial government submits an annual socioeconomic public investment program (PIP). The focus of these yearly provincial plans is the reduction of poverty through a series of projects that will provide key services (eg water, electricity etc), and restore infrastructure (eg roads, bridges and social infrastructure, schools, health centers). The provincial plans form part of an effort to decentralise decision-making and are developed through consultation with municipal administrators and sometimes traditional leaders but not usually local communities.

The plans are appraised by the Directory of Investment (in the Ministry of Planning) in Luanda and financed according to the Poverty Strategy priorities, program soundness and local government capacity. There can be a significant disparity between what is planned and what is actually disbursed.

*Tombwa Municipality Development Plans*

The latest regional development plan is the '*Provincial Economic and Social Development Program Plan 2009-2013'*. This summarises the key priorities for Tombwa Province – the province in which the Project is situated. Other relevant plans and projects include the '*Social development Progress Plan;* the *'Municipal Infrastructure Rehabilitation Project'*; and the *Transport Plan.* Additional detail on these plans will be provided in the full ESHIA.

## *2.3 NAMIBIA*

### *2.3.1 Government and Administration*

Article 102 of the Constitution provides that the Country be divided into regional and local units. In keeping with this constitutional requirement, thirteen administrative regions and Local Authorities have been established in terms of both Regional Councils Act and Local Authorities Acts of 1992. The thirteen regions are Caprivi, Erongo, Hardap, Karas, Khomas, Kunene, Ohangwena, Okavango, Omaheke, Omusati, Oshana, Oshikoto, Otjozondjupa. The Baynes Hydropower Project is situated in the Kunene Region of Namibia.

The legislature branch of government is responsible for making laws of the Country. The main law-making body is the Parliament, which consists of two different chambers, namely the National Assembly and the National Council. The Assembly is the primary legislative body, with the Council playing more of an advisory role.

The 1990 constitution is noted for being one of the first to incorporate protection of the environment into its text.

The Judiciary in terms of Article 78 of the Constitution, judicial powers are vested in the Courts of Namibia, which consist of a Supreme Court, a High Court and Lower Courts. The Courts are independent and subject only to the Constitution and the law.

Namibia is a democratic but one party dominant state with the South-West Africa People's Organisation (SWAPO) in power.

The Cabinet consists of the President, the Prime Minister, Deputy Prime Minister, and Ministers appointed by the President. Together, they implement the policies guided by the constitution and acts of Parliament. The Prime Minister is the Chief Advisor to the President and the overall coordinator of the Government Offices, Ministries, and Agencies. Under the Prime Minister are Ministers and Deputy Ministers and their staff members who are responsible for the different Ministries.

The key ministries and other administrative organisations that are relevant to the water and energy sector in Namibia are briefly outlined below.

*Ministry of Environment and Tourism*

The Ministry of Environment and Tourism (MET) is responsible for the safeguarding Namibia's environmental resources. Its mission is "*to maintain and rehabilitate essential ecological processes and life-supported life-support systems, to conserve biological diversity and to ensure that the utilization of natural resources is sustainable for the benefit of all Namibians, both present and future, as well as the international community, as provided for in the Constitution*". The mandate necessary for this Ministry to assume the above mentioned responsibility include the following objectives:

- to conserve the natural environment in Namibia;
- to protect biological diversity and life support systems, in partnership with other ministries, organisations and individuals;
- to expand, develop, manage and control the country's conservation areas;
- to manage and coordinate natural resources and to encourage the development of appropriate wildlife and forestry based industries;
- to foster the sustainable use of all living resources, in partnership with other ministries, organisations and individuals;
- to conserve wilderness, and to protect the character and beauty of Namibia;
- to initiate and/or participate in all land-use planning with regard to natural resources and the preparation, implementation and management of community-based conservation and development programmes;
- to initiate and/or participate in the development of the natural resource-base and methods of utilisation so that people obtain the maximum sustainable benefits;
- to apply appropriate environmental, social and economic assessment procedures to development proposals, plans and projects;
- to develop, coordinate and promote tourism on a sustainable basis, both within proclaimed conservation areas and in the country as a whole, in partnership with other organisations;
- to control standards on environmental pollution;
- to conduct and promote environmental education, extension and awareness programmes, in partnership with other ministries and organisations;
- to conduct and promote research, monitoring and evaluations, and the coordination of these activities, in support of the above objectives, as well as the communication of results at local, national and international levels;
- to develop, apply and evaluate environmental policies, plans and legislation so as to allow this Ministry to achieve the above objectives; and
- to create and maintain an environment where every employee is able to reach his or her maximum potential in a climate, favouring innovation and excellence.

The Ministry of Environment and Tourism is the custodian of Namibia's natural environment and discharges this duty via environmental regulations.

*Ministry of Mines and Energy*

The Ministry of Mines and Energy (MME) guards and facilitates the utilisation of Namibia's energy sources by "*promoting, facilitating, and regulating the responsible development and sustainable utilization of Namibia's mineral, geological and energy resources through competent staff, innovation, and research and stakeholder collaboration in a conducive environment for the benefit of all Namibians*."

The responsibility for the investigation into the possible utilisation of the Kunene River as a source of power therefore lies with this Ministry, together with their counterpart in Angola.

*Ministry of Agriculture, Water and Forestry*

Because the Project proposes to utilise water from one of Namibia's only two permanent rivers, the Ministry of Agriculture, Water and Forestry (MAWF) is an important role player in the decision-making process. MAWF's mission is "*to realize the potential of the Agricultural, Water and Forestry sectors towards the promotion of an efficient and sustainable socio-economic development for a prosperous Namibia*". Their mandate is therefore to promote, develop and utilise these resources.

*Ministry of Regional and Local Government, Housing and Rural Development*

The Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD) facilitates the establishment of an effective regional and local government system that brings government closer to the people and is capable of delivering services to the satisfaction of all communities. It provides central government support to regions and local governments in the areas of housing, community development and physical planning.

Other important administrative and legislative role players applicable to the Project include:

- **NamPower** is the national power utility responsible for the supply of electricity to users with a demand exceeding 5MW. NamPower's main sources of power are currently the thermal, coal-fired Van Eck Power Station in Windhoek, the hydroelectric plant at the Ruacana Falls in the Kunene Region, and the standby diesel-driven Paratus Power Station at Walvis Bay.
- **The Kunene Regional Council**, under the Ministry of Regional and Local Government and Housing would consider the proposed Project from a political perspective and provide guidance as far as planning issues are concerned in the nearby urban centres (Opuwo and any new communities created as a result of this Project).

- **The Ministry of Health and Social Services** (MOHSS) who are the applicable Ministry enforcing the Pollution Prevention Ordinance and the Public Health Act.
- **The Ministry of Works, Transport & Communication** who will be responsible authority to approve a technically sound road access network on the Namibian side to the development.
- **The Ministry of Labour**, which is the applicable Ministry in all matters related to the employment of workers, including contractors. This Ministry is also responsible for the inspection of facilities in terms of the health and safety of employees at work.

### *2.3.2 Environmental and Social Legislation*

*Environmental legislation*

Environmental Assessment Policy (1995)

Namibia's Environmental Assessment Policy was endorsed by Cabinet and published in 1995. The Policy provides a procedure for environmental assessments, as indicated in which sets out to:

- better inform decision makers and promote accountability of decisions taken;
- strive for a high degree of public participation and involvement by all sectors of the Namibian community in the environmental assessment process;
- take into account the environmental costs and benefits of proposed policies, programmes and projects;
- take into account the secondary and cumulative environmental impacts of policies, programmes and projects; and
- promote sustainable development in Namibia, and especially ensure that a reasonable attempt is made to minimise anticipated negative impacts and maximise the benefits of all development.

Environmental Management Act (2007)

Namibia's Environmental Management Act was passed in Parliament in October 2007, and gives effect to Namibia's Environmental Assessment Policy. Essentially this Act specifies the environmental assessment procedure to be followed (provided in listed activities). Of relevance to this Project are the following listed activities, provided in Section 27 of this Act, which include:

- the erection or construction of facilities for the commercial generation of electricity with an output of more than one megawatt;
- the construction of public roads;
- the construction or upgrading of airports, airfields and associated structures;

- the construction of canals and channels including the diversion of the normal flow of water in a riverbed and water transfer schemes between water catchments and impoundments;
- the construction of dams, reservoirs, levees and weirs;
- the erection and construction of buildings and structures for manufacturing, processing, industrial or military activity;
- the erection and construction of waste sites, including any facility for the final disposal or treatment of waste;
- prospecting, quarrying, mining, mineral extraction or mineral beneficiation activity;

The information to be included in the environmental report according to the Draft Regulations of the Environmental Management Act (2007) as provided below in *Box 2.3*.

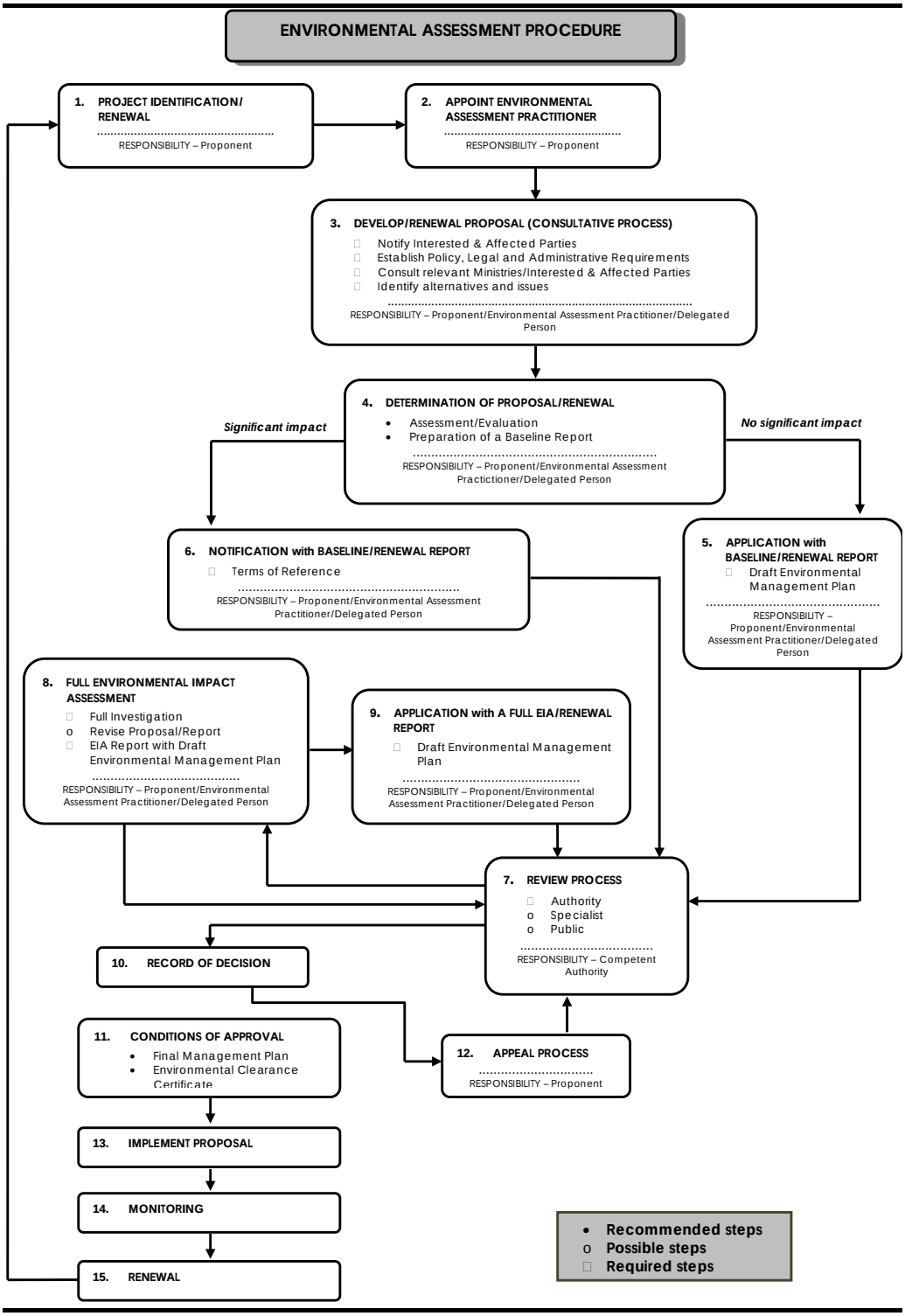
***Box 2.3 Schedule 3 - Information for Environmental Reports***

In accordance with the provisions of the relevant procedures and guidelines the environmental report shall cover all relevant information with respect to the policy, plan, programme or project but not limited to the following:

a) An outline of the contents and main objectives of the plan, programme, or project, and of its relationship with other relevant policy, plan, programme, or project;
b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the policy, plan, programme, or project;
c) The environmental characteristics of the areas likely to be significantly affected;
d) Any existing environmental problems which are relevant to the policy, plan, programme or project including, in particular, those relating to any areas of a particular environmental importance, such as areas with recognised national, local community or international protection status;
e) The environmental protection objectives, established at international, community or Member State level, which are relevant to the policy, plan, programme or project and the way those objectives and any environmental considerations have been taken into account during its preparation;
f) The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as:
   (v) human health;
   (vi) population;
   (vii) cultural heritage, including architectural and archaeological heritage;
   (viii) landscape;
   (ix) biodiversity;
   (x) fauna;
   (xi) flora;
   (xii) soil;
   (xiii) water;
   (xiv) air;
   (xv) climatic factors;
   (xvi) material assets; and
   (xvii) the inter-relationship that may exists at plan, programme or project levels.
g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the policy, plan, programme or project;
h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;
i) A description of the measures envisaged concerning monitoring in accordance with the relevant procedures and guidelines; and
j) A non-technical summary of the information.

The process to be followed in Namibia for environmental assessment is outlined in *Figure 2.2*.

*Figure 2.2 The Namibian EIA Submission and Approval Process*




*Environmental legislative requirements*

In consideration of environmental legislation, the following project related issues are considered:

- discharge to fresh and marine surface water;
- wetlands;
- prevention of surface and groundwater pollution;
- waste management;

- fisheries;
- biodiversity conservation;
- natural heritage conservation; and
- noise and vibration.

*Social legislation*

The assessment of the social implications of policies, plans or projects are required in terms of the Namibian Environmental Management Act (2007).

The terms "environment" in the context of the Environmental Management Act includes "*the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values*". It follows that the baseline human conditions and the effect of a project on these conditions in its environment need to be established and reported on as part of the environmental assessment process.

The act also provides for ensuring that there are opportunities for timeous participation of I&APs throughout the assessment process in matters affecting their lives.

*Social legislative requirements*

In the consideration of social legislation, the following project related issues are considered:

- general environmental protection and social and environmental assessment and management systems;
- rights and duties;
- access to resources, including land, grazing and shelter;
- heritage conservation;
- labour, working conditions and employment;
- public Health; and
- land management.

*Table 2.2* presents a summary of the most relevant and significant national legislation for Namibia that may apply (based on current understanding) to the Project.

***Table 2.2 Summary of Relevant Namibian Environmental and Social Legislation***

| Issue | Applicable Legislative Instrument |
|---|---|
| **Environmental** | |
| Discharge to Surface Water (fresh and marine) and Groundwater | • *Water Act 54 of 1956 and the Water Resources Management Act 24 of 2004*<br>*The Water Resources Management Act is presently without regulations; therefore the Water Act is still in force. Affords general protection against surface and underground water pollution. Provides for permits to abstract water from a water resource, disposal of industrial or domestic waste water and effluent. Prohibits the pollution of underground and surface water bodies. Includes liability of clean up costs after closure/* |

| Issue | Applicable Legislative Instrument |
|---|---|
| | *abandonment of an activity.* |
| Wetlands | • *Namibia's Draft Wetland Policy (2004)*<br>*To manage national and shared wetlands wisely by protecting their biodiversity, vital ecological functions and life support systems for the current and future benefit of people's welfare, livelihoods and socio-economic development. Strives to complement existing policy instruments regarding sustainable development and sound natural resource management in Namibia.* |
| Waste Management | • *Hazardous Substances Ordinance 14 of 1974*<br>*Control of substances which may cause injury or ill-health or death of human beings because of their toxic, corrosive, irritant, strongly sensitizing or flammable nature.*<br>• *Pollution Control and Waste Management Bill*<br>*Aims to prevent and regulate the discharge of pollutants to air, water, and land and will regulate noise, dust, and odour pollution. Further aims are to establish a system of waste planning and management, and to enable Namibia to comply with its obligations under international law in this regard.* |
| Fisheries | • *Inland Fisheries Resources Act 1 of 2003*<br>• *Marine Resources Act 27 of 2000* |
| Biodiversity | • *Article 95 of the Constitution*<br>*"maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a*<br>• *sustainable basis for the benefit of all Namibians, both present and future"*<br>• *Forest Act 12 of 2001*<br>*Provision for the protection of various plant species.*<br>*Section 22(1): It is unlawful for any person to "cut, destroy or remove any living tree, bush or shrub growing within 100 metres from a river, stream or watercourse on land that is not part of a surveyed erf or a local authority area without a licence.*<br>• *Nature Conservation Ordinance 4 of 1975*<br>*Protects inter alia nature reserves, conservancies, the hunting and protection of wild animals, and the protection of indigenous plants.*<br>*Prohibits disturbance or destruction of the eggs of huntable game birds or protected birds without a permit.*<br>*Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants without a permit.*<br>• *Preservation of Trees and Forests Ordinance*<br>*Protection to tree species.* |
| Natural Heritage | • *National Heritage Act (2004)*<br>*Heritage resources are to be identified and a permit obtained from the National Monuments Council for their removal/destruction, with mitigation measures approved before any development may commence.* |
| Noise & Vibration | • *Labour Act (1992)*<br>*Set noise limits for processing plants and the identification of noise zones within which protective clothing is compulsory.* |
| **Social** | |
| General Environmental Protection and Social and Environmental Assessment and Management Systems | • *Environmental Management Act (2007)*<br>*Requires that projects with significant environmental impact are subject to an environmental assessment process.* |
| Rights and duties | • *Articles 5-8 and 21 of the Namibian Constitution* |
| Social Issues under Environmental Law | • *Environmental Management Act (2007)*<br>*Requires for adequate public participation during the environmental assessment process for interested and affected parties to voice their opinions about a project.* |
| Access to fishing | • *Inland Fisheries Resources Act 1 of 2003* |
| Resettlement and | • *Article 21 of the Namibian Constitution* |

| Issue | Applicable Legislative Instrument |
|---|---|
| displacement | |
| Heritage | • *National Heritage Act (2004)*<br>*All heritage resources to be identified and either protected or removed/mitigated with a permit from the National Monuments Council, before any development may take place. Heritage assessments undertaken as part of the environmental assessment process.* |
| Labor, Working Conditions and Employment | • *Labour Act (1992)*<br>*Health and Safety Regulations*<br>*Minimum wages and working conditions including health and safety measures.*<br>*Affirmative Action (Employment) Act 29 0f 1998*<br>*Article 9 of the Namibian Constitution* |
| Public Health | • *Public Health Act 36 of 1919*<br>*Provides for the prevention of pollution of public water supplies.* |
| Land Issues | • *Communal Land Reform Act 5 of 2002*<br>*Provides for the allocation of rights in respect of communal land; powers of Chiefs and Traditional Authorities in relation to communal land*<br>*Traditional Authorities Act 25 of 2000*<br>*Provides for the establishment of traditional authorities and leaders.* |
| Local and Regional Authorities | • *The Local Authorities Act, Act 23 of 1992*<br>*Establishment of local authorities and defines the power, duties and functions of scheduled authority councils of local authorities.*<br>• *The Regional Councils Act, Act 22 of 1992*<br>*Establishes Regional Councils and defines the duties, functions and powers of the Regional Councils. Regional Councils are responsible for the general administration and development of a region excluding the local authority areas managed by local authorities.* |
| Land use planning issues | • *Town Planning Ordinance, Ordinance 18 of 1954*<br>*Regulates the establishment of new townships and any subdivisions of non-urban land or changes in use of land (excluding the subdivision of commercial farmland.) Requires all local authorities to prepare Town Planning Schemes which are statutory schemes regulating issues such as land use zoning, building lines, heights, parking requirements, and even building quality.*<br>• *The Township and Division of Land Ordinance, Ordinance 11 of 1963 as amended*<br>*Regulates the Establishment of Townships and the subdivision and consolidation of urban land.* |

### *2.3.3 Development Policies*

The development policies for Namibia at a national level are outlined below in *Box 2.4*.

## *Box 2.4 Development Policies*

**Namibia Vision 2030**

Vision 2030 expresses Namibia's aspirations in growing the economy, further good governance and most importantly developing its people. It covers a very wide spectrum of challenges and responses. The concept of sustainable development is the cornerstone on which the formulation of Vision 2030 was based. It holds that sustainable development is achieved only where sustainability in all sectors of endeavour is attained – social, economic and ecological. Vision 2030 provides for the following sub-visions that are relevant:

- Namibia's fresh water resources are kept free of pollution and are used to ensure social welling-being, support economic development and to maintain natural habitats.
- The integrity of Namibia's natural habitats and wildlife populations are maintained, whilst significantly supporting national socio-economic development through sustainable, low-impact, consumptive and non-consumptive tourism.
- Namibia's marine species and habitats significantly contribute to the economy without threatening biodiversity or the functioning of natural ecosystems, in a dynamic external environment.
- The integrity of vital ecological processes, natural habitats, and wild species throughout Namibia is maintained whilst significantly supporting national socioeconomic development through sustainable low-impact, high quality consumptive and non-consumptive uses, as well as providing diversity of urban and rural livelihoods.
- Namibia develops a significantly more equitable distribution of social well-being, through the sustainable utilisation of natural resources in a mixed economy, characteristics of higher income countries, primarily through stronger growth and poverty reduction (Government of Namibia, 2004).

**The Poverty Reduction Strategy (PRS)**

The Poverty Reduction Strategy (PRS) maps out the main direction for poverty reduction in Namibia. The PRS is built around three main issues:

- Fostering more equitable and efficient delivery of public services in the context of Namibia's commitment to decentralisation.
- Accelerating equitable agricultural expansion, including consideration for food security and other crop development options.
- Exploring options for non-agricultural economic empowerment, including an emphasis on informal and self-employment options.

The Namibian Government has put in place various redistribution policies aimed at bridging the gap between the rich and the poor in its poverty reduction efforts. Prominent among these are Social Transfers, the Affirmative Action Loan Scheme and Land Reform. These policies are aimed at improving the economic status and well-being of the previously disadvantaged groups. The National Poverty Reduction Action Program (NPRAP) consequently identifies programmes, projects, and services that focus on poverty reduction in accordance with the Second National Development Plan (NDP 2) and it's Public Sector Investment Plan (PSIP).

**National Development Plan (NDP3)**

While Vision 2030 provides the long term development framework for Namibia, NDP3 (ie the third National Development Plan) is the main vehicle to translate the Vision into action.

The development directives of NDP3 are derived from the country's long term aspirations under Vision 2030, the 2004 Election Manifesto, the guidance from the Cabinet Special Retreat, the Millennium Declaration, and the Millennium Development Goals (MDGs) and the lessons learnt from implementing NDP2.

One of the sub-sector goals of NDP3 is "*to ensure secure and efficient supply of energy that is environment friendly and leads to a reduction in the country's reliance on energy imports*" (NPC, 2008).

**Kunene Regional Development Plan**
This Plan, drafted for the period 2001/2002-2005/2006 is outdated, but has not been updated. The Plan focuses on fighting poverty, unemployment, hunger and the HIV/AIDS pandemic. It provides broad thrusts per sector to be implemented in the mentioned period. The Plan's Vision Statement is "*The development of the Kunene Region, through the implementation of a regional development plan, focused on sustainable market related development and the sustainable management and utilization of the natural resources of the Kunene Region*." The Plan states that a vital asset of the region is its unique and fragile natural environment, which requires the management of environmental impact of any development projects as a matter of priority. The Plan includes a reference to the proposed Epupa/Baynes Hydropower Scheme, stating that it "could promote economic development in the region (agriculture and tourism).

**Namibia's Wetland Policy (2003)**
The Vision of the Policy is that "*Namibia shall manage national and shared wetlands wisely by protecting their biodiversity, vital ecological functions and life support systems for the current and future benefit of people's welfare, livelihoods and socio-economic development*"

The policy further recognises that:

- "*all the water used for social and economic growth originates from natural wetlands*
- *there is a need to develop a strong, growing and diversified economy in Namibia*
- *Human needs for potable water are paramount*
- *the environment is a legitimate water user and that healthy wetlands provide the basis of a healthy, sustainable water supply*
- *in order to safeguard water quality, minimise the loss of livelihood options and the high financial costs associated with wetland rehabilitation, sufficient water must be available to maintain the biological diversity, essential ecological functions and goods and services provided by wetland ecosystems*
- *wetlands have been identified as Namibia's most threatened ecosystems*
- *most wetlands in Namibia form part of much larger systems that are shared with other countries and are under protected*
- *Namibia's wetlands are vulnerable to degradation from land clearing, excessive water diversions, excessive burning, pollution, invasive alien species and changes to water flow patterns from both within and outside our borders*
- *Namibia is extremely vulnerable to water pollution from both inside and outside national borders*
- *Namibia's valuable comparative advantages on the global market (particularly its relatively uncontaminated free-range meat and fish products) are severely threatened by POPs (like DDT) and other types of chemical pollution*
- *there is a need for harmonisation with existing national and international policies to enhance wetland conservation (See Appendix 1)*
- *certain wetlands or components of wetlands in Namibia demand absolute protection*"

## 2.4 *INTERNATIONAL TREATIES, CONVENTIONS AND PROTOCOLS*

Angola and Namibia are signatories to a number of international conventions and agreements relating to industry, environmental management and energy. In certain cases these have influenced policy, guidelines and regulations and must be complied with by the planning, construction and operation of the proposed development.

*Table 2.3* lists the relevant international conventions and protocols to which Angola and Namibia are signatories.

*Table 2.3 Dates of Ratification of International Conventions*

| Angolan Date of Ratification | Namibian Date of Ratification | Name of Convention |
|---|---|---|
| 1997 | 1997 | United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification (UNCCD) |
| 1991 | 1975 | UNESCO World Heritage Convention |
| 1998 | 1992 | United Nations Convention on Biological Diversity |
| 2000 | 1992 | United Nations Framework Convention on Climate Change |
| 2007 | 2003 | Kyoto Protocol on the Reduction of Greenhouse Gas Emissions |
| 2002 | N/A | Statutes of the International Union for the Conservation of Nature and its Resources (IUCN) |
| N/A | 1998 | SADC Protocol on Shared Watercourse Systems in the Southern African Region |
| N/A | 1995 | Convention on Wetlands of International Importance, especially as Waterfowl Habitat (RAMSAR) Convention |
| N/A | 1995 | Basel Convention |
| N/A | 2001 | UN Convention on the Law of the Non-Navigable Uses of International Watercourses |
| **Social Ratifications Angola** | **Social Ratifications Namibia** | |
| 1966 | 1966 | International Covenant on Economic, Social and Cultural Rights |
| 1990 | N/A | African Charter on Human and Peoples' Rights |
| 1991 | 2000 | Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 |
| 1986 | 1992 | Convention on the Elimination of All Forms of Discrimination against Women |
| 1997 | 1998 | SADC Protocol on Energy |
| 2003 | 2002 | SADC Protocol on Fisheries |

## 2.5 *INTERNATIONAL GUIDELINES AND STANDARDS*

The aim of following international guidelines and standards is to ensure all issues are considered and managed in line with international best practice. Specifically the rights of indigenous people (to ensure the rights of the Himba people are considered through the project) as well as environmental and social issues.

The international guidelines and standards also require prior and informed participation in the process for all stakeholders. Furthermore, following such guidance is in line with the Terms of Reference provided by the PJTC for the Baynes Hydropower Project and will ensure mistakes made in the Epupa Dam study are not repeated.

***The Baynes Hydropower Project will conform to the World Bank Safeguard Policies and the IFC performance standards. The Project will also take into account the international standards for dam-building set by the World Commission on Dams and the International Hydropower Association (IHA) Sustainability Guidelines (SGs) and Sustainability Assessment Protocol (SAP) in order for the Project to be approved for carbon credits under the Kyoto Protocol's Clean Development Mechanism (CDM).***

### *2.5.1 World Bank Group Operation Policies*

The World Bank has 10 environmental and social "Safeguard Policies" that are use to examine the potential environmental and social risks and benefits associated with World Bank lending operations. These safeguard policies include the following:

1. Environmental Assessment;
2. Natural Habitats;
3. Forestry;
4. Pest Management;
5. Cultural Property;
6. Revised Draft Operational Policy 4.10: Indigenous People (replaces operational Directive 4.20 on Indigenous Peoples);
7. Involuntary Resettlement;
8. Safety of Dams;
9. Projects in International Waters; and
10. Projects in Disputed Areas.

The policies relevant to the Baynes Hydropower Project include 1, 6, 7, 8 and 9 and are summarised below.

*Environmental Assessment*

Environmental Assessment (EA) evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimising, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects.

*Revised Draft Operational Policy 4.10: Indigenous People*

The World Bank Policy on Indigenous Peoples (OP/BP 4.10, Indigenous Peoples) underscores the need for Borrowers and Bank staff to identify

indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimised or mitigated.

This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For all projects that are proposed for Bank financing and affect Indigenous Peoples, the Bank requires the borrower to engage in a process of free, prior, and informed consultation.

Such projects must include measures to:

- avoid potentially adverse effects on the Indigenous Peoples' communities; or
- when avoidance is not feasible, minimise, mitigate, or compensate for such effects.

Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and intergenerationally inclusive. Furthermore, the policy recognises that the identities and cultures of Indigenous Peoples are inextricably linked to the lands on which they live and the natural resources on which they depend. These distinct circumstances expose Indigenous Peoples to different types of risks and levels of impacts from development projects, including loss of identity, culture, and customary livelihoods, as well as exposure to disease.

The World Bank requires projects that affect Indigenous People to undertake:

- screening to identify whether Indigenous Peoples are present in, or have collective attachment to, the project area;
- a social assessment;
- a process of free, prior, and informed consultation with the affected Indigenous Peoples' communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project;
- the preparation of an Indigenous Peoples Plan or an Indigenous Peoples Planning Framework; and
- disclosure of the draft Indigenous Peoples Plan or draft Indigenous Peoples Planning Framework.

*Involuntary Resettlement*

The World Bank's Operational Policy 4.12: Involuntary Resettlement is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The

policy aims to avoid involuntary resettlement to the extent feasible, or to minimise and mitigate its adverse social and economic impacts.

It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement.

The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

*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 through 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.

*Projects in International Waters*

Operational Policy (OP) 7.50: Projects on International Waterways requires that all water resource projects that involve the use of, or the potential pollution of, international waterways such as rivers, canals, lakes or similar bodies that form boundaries with or flow through two or more countries, evidence should be provided that: 1) the host country has notified the affected country (or countries) of the proposed project and 2) that the project meets relevant agreements or arrangements between the countries relating to the use and protection of the international waterway.

### *2.5.2 The International Finance Corporation*

*Performance Standards*

The International Finance Corporation (IFC), a division of the World Bank Group that lends to private investors, has recently released a Sustainability Policy and set of Performance Standards on Social and Environmental Sustainability (in force from July 2006) (see *Box 2.5*). These Standards replace the prior safeguard policies and are used to evaluate any project seeking funding through the IFC. The Equator Principles (1) which reflect the

(1) The Equator Principles are a financial industry benchmark for determining, assessing and managing social & environmental risk in project financing. As of 01/11/2007, they had been adopted by 56 major banking institutions. The

application by major international banking institutions of IFC-inspired environmental and social best practice guidelines in the financing of large projects have been revised to adhere to the new IFC Performance Standards. However, the Equator Principles Financial Institutions (EPFIs) do not use the IFC's Sustainability or Disclosure Policy, as these were not adopted by the banks. The EPFIs have their own sustainability and disclosure policies, and take the same approach, eg the borrower's/client's project must comply with the Performance Standards and the applicable Environment Health and Safety (EHS) Guidelines.

***Box 2.5 IFC Performance Standards***

- Performance Standard 1: Social and Environmental Assessment and Management System;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Pollution Prevention and Abatement;
- Performance Standard 4: Community Health, Safety and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.

The Performance Standards underscores the importance of managing environmental, social and health issues throughout the life of a project. They identify the need for an effective social and environmental management system that is dynamic and continuous, '*involving communication between the client, its workers, and the local communities directly affected by the Project*'. They require '*thorough assessment of potential social and environmental impacts and risks from the early stages of project development and provides order and consistency for mitigating and managing these on an ongoing basis*'. (1)

The Performance Standards reinforce the importance of effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them.

Through the Performance Standards, the IFC requires clients to engage with affected communities through disclosure of information, consultation, and informed participation, in a manner commensurate with the risks to, and impacts on, the affected communities.

The IFC Performance Standards, and each of their objectives, are outlined in *Table 2.4* below.

***Table 2.4 International Finance Corporation (IFC) Performance Standards***

| Performance Standards | Objectives |
|---|---|

Equator Principles reflect a common set of international, IFC-inspired best practices guidelines to manage social and environmental risks related to the financing of large projects.
(1) IFC, 2006.

| Performance Standards | Objectives |
|---|---|
| **Social and Environmental Assessment and Management System**<br>**Performance Standard 1** underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management). | • *Impact identification and assessment.* To identify and assess social and environmental impacts, both adverse and beneficial, in the project's area of influence<br>• *Mitigation.* To avoid, or where avoidance is not possible, minimise, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment<br>• *Stakeholder engagement.* To ensure that affected communities are appropriately engaged on issues that could potentially affect them<br>• *Effective management.* To promote improved social and environment performance of companies through the effective use of management systems |
| **Labour and Working Conditions**<br>**Performance Standard 2** recognises that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers. | • To establish, maintain and improve the worker management relationship.<br>• To promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labor and employment laws.<br>• To protect the workforce by addressing child labour and forced labor.<br>• To promote safe and healthy working conditions, and to protect and promote the health of workers. |
| **Pollution Prevention and Abatement**<br>**Performance Standard 3** recognises that increased industrial activity and urbanisation often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level. | • To avoid or minimise adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities<br>• To promote the reduction of emissions that contribute to climate change |
| **Community Health, Safety and Security**<br>**Performance Standard 4** recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. | • To avoid or minimise risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances<br>• To ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimises risks to the community's safety and security |
| **Land Acquisition and Involuntary Resettlement**<br>**Performance Standard 5** outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition | • To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities<br>• To promote the reduction of emissions that contribute to climate change |

| Performance Standards | Objectives |
|---|---|
| **Biodiversity Conservation and Sustainable Natural Resource Management**<br>**Performance Standard 6** recognises that protecting and conserving biodiversity—the variety of life in all its forms, including genetic, species and ecosystem diversity—and its ability to change and evolve, is fundamental to sustainable development | • To protect and conserve biodiversity<br>• To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities |
| **Indigenous Peoples**<br>**Performance Standard 7** recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population. | • To ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples<br>• To avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not feasible, to minimise, mitigate, or compensate for such impacts, and to provide opportunities for development benefits, in a culturally appropriate manner<br>• To establish and maintain an ongoing relationship with the Indigenous Peoples affected by a project throughout the life of the project<br>• To foster good faith negotiation with and informed participation of Indigenous Peoples when projects are to be located on traditional or customary lands under use by the Indigenous Peoples<br>• To respect and preserve the culture, knowledge and practices of Indigenous Peoples |
| **Cultural Heritage**<br>**Performance Standard 8** recognises the importance of cultural heritage for current and future generations | • to protect cultural heritage from the adverse impacts of project activities and support its preservation<br>• to promote equitable sharing of benefits from the use of cultural heritage in business activities |

### *2.5.3 IFC Environmental, Health and Safety (EHS) Guidelines*

The EHS Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility. The EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to Performance Standard 3: Pollution Prevention & Abatement, as well as certain aspects of occupational and community health and safety.

When host country (Namibian and Angolan) regulations differ from the levels and measures presented in the EHS Guidelines, projects will be 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 required.

There are no industry specific guidelines for Hydropower Projects, although guidelines do exist for electrical power transmission and generation.

General EHS Guidelines also exist which contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors are listed in *Box 2.6*.

***Box 2.6 IFC General EHS Guidelines***

*General EHS Guidelines*

**1. Environmental**
1.1 Air Emissions and Ambient Air Quality
1.2 Energy Conservation
1.3 Wastewater and Ambient Water Quality
1.4 Water Conservation
1.5 Hazardous Materials Management
1.6 Waste Management
1.7 Noise
1.8 Contaminated Land

**2. Occupational Health and Safety**
2.1 General Facility Design and Operation
2.2 Communication and Training
2.3 Physical Hazards
2.4 Chemical Hazards
2.5 Biological Hazards
2.6 Radiological Hazards
2.7 Personal Protective Equipment (PPE)
2.8 Special Hazard Environments
2.9 Monitoring

**3. Community Health and Safety**
3.1 Water Quality and Availability
3.2 Structural Safety of Project Infrastructure
3.3 Life and Fire Safety (L&FS)
3.4 Traffic Safety
3.5 Transport of Hazardous Materials
3.6 Disease Prevention
3.7 Emergency Preparedness and Response

**4. Construction and Decommissioning**
4.1 Environment
4.2 Occupational Health and Safety
4.3 Community Health and Safety

### *2.5.4 World Commission on Dams and the United Nation Environment Programme – Dams and Development Project (DDP)*

*Background*

The World Commission on Dams (WCD) was established in May 1998 in response to the escalating local and international controversies over large dams. It was mandated to review the development effectiveness of large dams and assessed alternatives for water resources and energy development; and

develop internationally acceptable criteria, guidelines and standards for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams.

In November 2000 the WCD launched its report and in 2001 was disbanded having undertaken its assigned activities. The Dams and Development Project (DDP) was set up in response to the need identified by stakeholder for a group to provide guidance and support for national follow-up processes, further disseminate the WCD final report and knowledge base materials and provide information on activities undertaken around the world in response to the report.

*WCD Framework*

The WCD's final report (1) describes an innovative framework for planning water and energy projects that is intended to protect dam-affected people and the environment, and ensure that the benefits from dams are more equitably distributed. The WCD framework covers key areas for improved planning of dams, including the need to fully assess all available options for meeting water and energy needs; addressing outstanding social issues from existing dams before building new ones, gaining public acceptance for key decisions, and the importance of protecting healthy rivers. The WCD framework puts forward seven general 'strategic priorities' each based on a set of 'policy principles.' A set of 26 'guidelines for good practice' lay out specific actions for complying with the strategic priorities at five key stages of the project development process.

After publishing its final report, the WCD dissolved. The WCD framework however has become the most important benchmark in international dam building. A number of governments – including Germany, Nepal, South Africa, Sweden and Vietnam – have organised dialogue processes to integrate WCD recommendations into national policy. The World Bank, export credit agencies and the International Hydropower Association, while critical of specific recommendations, have endorsed the WCD's strategic priorities. The member states of the EU have decided that carbon credits from large dams can only be sold on the European market if the projects comply with the WCD framework. International Carbon Investors & Services, a group of international banks and other bodies involved in carbon trading, also require WCD compliance for large hydro projects. (2)

The requirement for dams to comply with the WCD framework under EU and other policies has created a demand for guidance on how to implement the framework and assess compliance with it. (3) The 'criteria checklists' and guidelines in chapter 9 of the WCD report are key to these tasks. The

(1) World Commission on Dams, 2000a.
(2) International Rivers (2008).
(3) International Rivers (2008).

following list in *Box 2.7* is not a checklist, but rather an illustrative example of key WCD recommendations compiled by International Rivers. (1)

***Box 2.7 Key WCD Recommendations***

- Development needs and objectives should be clearly formulated through an open and participatory process, before various project options are identified.
- A balanced and comprehensive assessment of all options should be conducted, giving social and environmental aspects the same significance as technical, economic and financial factors.
- Before a decision is taken to build a new dam, outstanding social and environmental issues from existing dams should be addressed, and the benefits from existing projects should be maximised.
- All stakeholders should have the opportunity for informed participation in decision-making processes related to large dams through stakeholder fora. Public acceptance of all key decisions should be demonstrated. Decisions affecting indigenous peoples should be taken with their free, prior and informed consent.
- The project should provide entitlements to affected people to improve their livelihoods and ensure that they receive the priority share of project benefits (beyond compensation for their losses). Affected people include communities living downstream of dams and those affected by dam-related infrastructure such as transmission lines and irrigation canals.
- Affected people should be able to negotiate mutually agreed and legally enforceable agreements to ensure the implementation of mitigation, resettlement and development entitlements.
- The project should be selected based on a basin-wide assessment of the river ecosystem and an attempt to avoid significant impacts on threatened and endangered species.
- The project should provide for the release of environmental flows to help maintain downstream ecosystems.
- Mechanisms to ensure compliance with regulations and negotiated agreements should be developed and budgeted for, compliance mechanisms should be established, and compliance should be subject to independent review.
- A dam should not be constructed on a shared river if other riparian States raise an objection that is upheld by an independent panel.

Source: International Rivers 2008.

### 2.5.5 *International Hydropower Association (IHA) Sustainability Guidelines and Sustainability Assessment Protocol*

The IHA has published Sustainability Guidelines (SGs) to promote greater consideration of environment, social, and economic sustainability in the assessment of:

- new energy projects;
- new hydro projects; and
- the management and operation of existing hydropower facilities.

To support the Sustainability Guidelines the IHA has also developed the Sustainability Assessment Protocol (SAP) to assist in assessing performance against criteria described in the IHA Sustainability Guidelines.

The Sustainability Assessment Protocol is divided into three sections. The first section (Section A – New Energy Projects) gives general guidance on

(1) International Rivers, 2008.

sustainability issues that should be considered when assessing new energy projects. Assessments associated with the second (Section B – New Hydro Projects) and third sections (Section C – Operating Hydropower Facilities) rely on objective evidence to support a sustainability score against each of the twenty fundamental aspects of economic, social, and environmental sustainability pertaining to new hydro projects (see *Table 2.5)*. These aspects of sustainability have been selected to give appropriate coverage to relevant economic, social, and environmental issues.

*Table 2.5 Summary of Aspects for New Hydro Projects*

| No. | Aspect | Score | No. | Aspect | Score |
|---|---|---|---|---|---|
| B1 | Political risk and regulatory approval | | B11 | Safety | |
| B2 | Economic viability | | B12 | Cultural heritage | |
| B3 | Additional benefits | | B13 | Environmental impact assessment and management plan | |
| B4 | Planned operational efficiency and reliability | | B14 | Threshold and cumulative environmental or social impacts | |
| B5 | Project management plan | | B15 | Construction and associated infrastructure impacts | |
| B6 | Site selection and design optimisation | | B16 | Land management and rehabilitation | |
| B7 | Community and stakeholder consultation and support | | B17 | Aquatic biodiversity | |
| B8 | Social impact assessment and management plan | | B18 | Environmental flows and reservoir management | |
| B9 | Predicted extent and severity of economic and social impacts on directly affected stakeholders | | B19 | Reservoir and downstream sedimentation and erosion risks | |
| B10 | Enhancement of public health and minimisation of public health risks | | B20 | Water quality | |

Assessment is scored from five through to zero, and looks at both process and performance against each aspect or criteria. A score of three is considered satisfactory and essentially meets the requirements of the Sustainability Guidelines. Lower scores indicate significant gaps and/or poor sustainability performance. A score of four indicates high standard performance, occasionally exceeding the requirements of the Sustainability Guidelines, with only very minor gaps. A score of five exceeds the requirements of the Sustainability Guidelines and is at, or very near, international best practice as applied to the actual / local situation.

In early 2008, the IHA – together with WWF and the Nature Conservancy – launched the Hydropower Sustainability Assessment Forum (HSAF) process. The aim of the HSAF is to produce a revised Sustainability Assessment Protocol that is 'broadly endorsed' and can be used to 'measure and guide performance in the hydropower sector.' A key motivation behind the HSAF process is the desire of IHA members to access concessional finance –

including through the sale of carbon credits – for hydropower projects with the help of a widely accepted Assessment Protocol. The Draft Sustainability Assessment Protocol is intended to be available in July 2009. (1)

### *2.5.6 Clean Development Mechanism (CDM)*

The CDM is one of the flexible mechanisms in the Kyoto Protocol to the UN Framework Convention on Climate Change (UNFCCC) designed to lower the cost of achieving emissions targets. It provides for a means of delivering greenhouse gas (GHG) emission reductions in, and promoting technology transfer to, Developing Countries who are signatories to the Protocol ("non-Annex I Countries").

Under the CDM, Annex I Countries are allowed to "buy" GHG reductions generated by CDM project activities undertaken in non-Annex I Countries, as long as such projects follow specific rules and receive independent verification. The GHG emission reduction for CDM projects is called a Certified Emission Reduction (CER), where each tonne of $CO_2$ equivalent ($CO_{2e}$) reduced by a CDM project equals 1 CER. CDM projects generate reductions in GHG emissions in developing countries which can be used by Annex I Countries to meet their GHG reduction commitment under the Kyoto Protocol.

Namibia is a non-Annex I country and therefore does not have a binding GHG reduction target set within the Kyoto Protocol. Namibia can thus participate in the CDM as the Host Country for development and implementation of CDM projects activities, with CERs from such projects being sold to an Annex I country or a commercial entity in an Annex I country. Namibia has an official Designated National Authority which provided guidance on in country criteria for CDM projects which include social and environmental sustainability criteria.

The CDM rules currently permit hydro power project under the approved consolidate methodology ACM0002 "*Consolidated baseline methodology for grid connected electricity generation from renewable sources*".

*CDM and WCD*

A European Union law called the Linking Directive regulates the use of CDM credits within the European Unions (EU)'s internal carbon trading system. The directive states that large hydro credits entering the European Trading System must comply with the criteria and guidelines of the World Commission on Dams.

The section of the directive dealing with hydro projects states: '*In the case of hydro–electric power production project activities with a generating capacity exceeding 20MW, Member States shall, when approving such project activities,*

(1) International Hydropower Association, 2006

*ensure that relevant international criteria and guidelines, including those contained in the World Commission on Dams (WCD) year 2000 Final Report [(1)], will be respected during the development of such project activities*.'

The World Bank, export credit agencies and the International Hydropower Association, while critical of specific recommendations, have endorsed the WCD's strategic priorities. The member states of the EU have decided that carbon credits from large dams can only be sold on the European market if the projects comply with the WCD framework (see *Section 2.5.4*). International Carbon Investors & Services, a group of international banks and other bodies involved in carbon trading, also require WCD compliance for large hydro projects.

More recently, there have been discussions within the EU about possibly applying the IHA Sustainability Guidelines to hydro CDM in addition to or even a replacement of the current WCD compliance requirement. The Baynes Hydropower Project will therefore take cognisance of both the WCD's strategic priorities and the IHA Sustainability Guidelines and Sustainability Assessment Protocol.

(1) World Commission on Dams, 2000b.

Chapter 3

# Strategic Alternatives

# 3 STRATEGIC ALTERNATIVES

This *Chapter* describes the identification and consideration of strategic alternatives, which is recognised as required practice in environmental assessment procedures globally. Strategic alternatives refer to those alternatives that were considered at a higher level than the project-level ESIA. It will place the alternatives in context, in addressing the key overarching and strategic informants that have motivated the proposed Baynes Hydropower Project.

## 3.1 ANGOLA

Angola currently faces the challenges of rapid economic growth associated with the demand for energy supply. A number of technologies are available to respond to this demand. One approach is to invest in hydropower which is well known and developed, resulting in less environmental impacts if compared to other conventional sources of energy production. If properly planned and operated, hydropower can be used within a framework of multiple water usage enable the implementation of other projects of regional importance.

Against this background, a number of possible sources of energy have been analysed which include:

- natural gas;
- diesel plants;
- biomass;
- hydropower; and
- solar energy.

Each of these energy sources are discussed in more detail below.

### 3.1.1 Natural Gas

The use of natural gas as source of energy is only viable when the factory is placed where there is an availability of such a resource. The supply of gas in Angola is limited to the Luanda and Cabinda provinces, thus the use of such an energy source is very limited. The use of natural gas has been included in the Angola Natural Liquefied Gas project in Soyo which is planned to become operational in 2012. The majority of the gas will be exported, although smaller quantities are to be used for domestic use.

### 3.1.2 Diesel Plants

The use of diesel to fuel energy plants is common in Angola due to the problems of armed conflict. When compared to natural gas, the use of diesel

makes the generation of energy more costly, polluting and inefficient. For these reasons diesel plants are being gradually replaced by natural gas.

The diesel plants in Angola are not a priority for the future although are being used as short-term solutions for the energy demand. For example, Lobito has a Diesel Plant with a capacity of 9.6 MW as well as a number of other diesel groups which are connected to the local grid. The city of Lubango (Huíla) also has a diesel plant with a capacity of 7.2 MW and another diesel plant is planned for Tômbwa (Namibe) with a capacity of 2x1.2 MW.

### *3.1.3 Biomass*

Over 80 percent of the Angolan population depends on biomass for cooking and heating with the rural and peri-urban areas using the majority of firewood and coal. This has a huge impact on the Angolan forests as well as implications for human health and quality of life. As result of these problems and to ensure the sustainable use of natural resources, the use of biomass for energy production is not a priority.

### *3.1.4 Hydropower*

The production of energy using hydropower stations has a number of advantages including the fact that it is a renewable source and low cost when compared to other energy sources. Angola has an estimated hydropower potential of around 150,000 GWh/year, of which about 65,000 GWh/year are considered to have good potential. There are future plans to build some 150 hydro plants excluding mini and micro plants (of less than 2 MW). The Angolan hydropower capacity is over 14,000MW for six out of 48 water basins as indicated in the *Table 3.1* below, which accounts only for 3.86 percent of the potential generating capacity.

***Table 3.1 Capacity (in MW) of Angola's Rivers***

| Water Basin | Dams | Capacity (MW) |
|---|---|---|
| Lucala river | 7 | 980 |
| Kwanza river | 10 | 5,730 |
| Longa river | 7 | 1,190 |
| Queve river | 8 | 3,020 |
| Catumbela river | 15 | 1,679 |
| Cunene river | 14 | 2,045 |
| **Total** | **61** | **14.644** |

### *3.1.5 Solar*

The use of solar energy is an alternative which can be used for rural communities and to provide energy for smaller households. Some projects have been trialled in Angola, particularly in social infrastructure such as schools, health and community centres. The use of solar energy to replace biomass would contribute towards a reduction of deforestation rates and the improvement of people's quality of live. However, its potential is still very limited if compared with the local needs.

The following strategic alternatives have been considered for this project:

- Angola Liquefied Natural Gas (ALNG)

The Angola Liquefied Natural Gas (ALNG) project will collect and gather associated gas produced during oil production and produce LNG for export, producing natural gas for the local market and produce Liquefied Petroleum Gas (LPG) for local and international markets, thereby making a significant contribution to the social and economic development of Angola.

The LNG plant will be located in the Zaire Province near the city of Soyo on the southern edge of the Congo River estuary in Northern Angola. The Associated Gas will originate from a number of oil fields in the offshore licensed Blocks 17, 18 and 15 located south of the Congo river and licensed Blocks 0 and 14 located north of the Congo River. The Non-Associated Gas will originate from new shallow water gas fields in Block 1 and 2 near Soyo.

## *3.2 NAMIBIA*

Namibia ratified the Kyoto protocol (1) on 4 September 2003 and in terms of its Agenda 21 commitments, NamPower has an obligation to provide electricity for all its citizens, with due consideration of the international perspective in terms of global warming. Namibia's Energy White Paper states that at least 100 percent of peak demand should be met, and that at least 75 percent of total electricity requirements should be derived from internal sources in 2010 (extended to 2012 in the latest National Development Plan (NDP3)).

A further undertaking is made to conserve non-renewable energy resources and to continue to research and utilise renewable energy sources (eg solar, wind). (2) The Energy White Paper states that 10 percent of supply should be sourced from internal renewable energy sources. (3)

Against this background, it may be asked why the Baynes Hydropower Project has been proposed as the project goes against global and domestic objectives to promote the utilisation of clean or renewable electricity sources, reduce greenhouse gas emissions and conserve non-renewable resources, especially in a country like Namibia which is very well placed to take advantage of solar and wind resources for the production of electricity.

As previously discussed in *Chapter 1*, the rationale is that Namibia needs to increase the base load (4) capacity to cater for increasing domestic demand and

(1) The Kyoto Protocol is a protocol to the international Framework Convention on Climate Change with the objective of reducing greenhouse gases in an effort to prevent anthropogenic climate change. 182 countries have ratified the protocol which came into affect on 16 February 2005. In terms of the Protocol, Namibia is required to monitor and report.
(2) Ninham Shand (Pty) Ltd, 2009.
(3) Ninham Shand (Pty) Ltd, 2009.
(4) Base load is defined as the minimum amount of power that a utility or distribution company must make available to its customers, or the amount of power required to meet minimum demand based on reasonable expectations of customer

in so doing reduce the dependency on energy imports from neighbouring countries. As illustrated in *Figure 3.1*, Namibia is reliant on producing an energy mix in order to support Namibia's future energy demands. Given the long lead times of generation capacity installation and approval, the government of Namibia is also prioritising a number of shorter-term solutions to address immediate supply issues. (1) Strategic planning is in place with processes underway for key potential projects as indicated in *Table 3.2*. NamPower has selected hydropower as part of the energy mix with which to reduce this dependency, as a result of the constraints and limitations associated with other base load fuel types and alternative energy sources, as described in greater detail below.

***Figure 3.1*** ***Long Term Load Project and Supply Schedules***

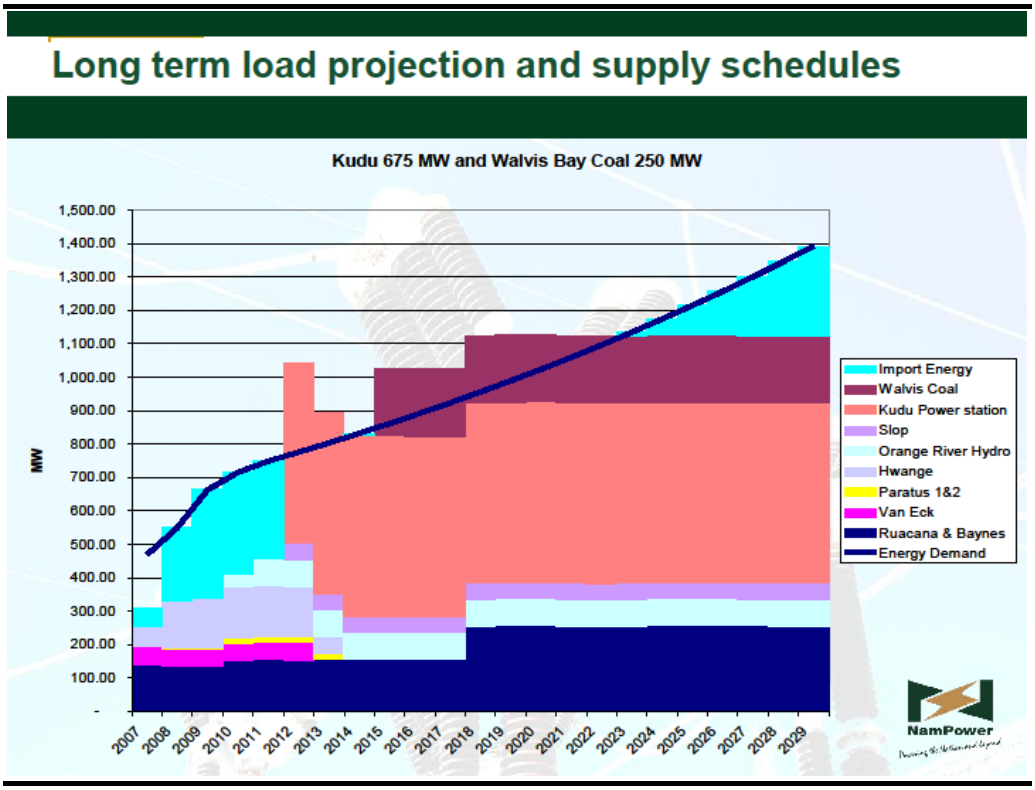



***Table 3.2*** ***Key Potential New Generation Projects***

| Proposed generating plant | Capacity (MW) | Dispatch | Anticipated date of commencement | Operational for period (years) |
|---|---|---|---|---|
| Ruacana 4th Turbine-Generator | 80 | Run of the River with CF40 percent* | 2011 | 30 |
| Small Orange River Hydro | 100 | Base | 2011 | 30 |
| Walvis Bay Slop | 70-270 | Mid Merit | 2011 | 30 |
| Kudu Gas | 450 - 800 | Base | 2013 | 22 |
| Walvis Bay Coal | 200 - 800 | Base | 2014 | 30 |
| Wind | 35 | CF35 percent | 2012 | 30 |

requirements. Baseload values typically vary from hour to hour in most commercial and industrial areas. Source: www.energyvortex.com.

(1) Ninham Shand (Pty) Ltd, 2009.

| Proposed generating plant | Capacity (MW) | Dispatch | Anticipated date of commencement | Operational for period (years) |
|---|---|---|---|---|
| Baynes Hydropower | 250 | Base or Mid Merit | Estimate of 2015 | 30 |

Source: Ninham Shand (Pty) Ltd., 2008.
*Capacity Factor (annual power output as a percentage of installed capacity)

Of these key potential new generation projects, the following strategic alternatives have been considered for this project:

- Combined Cycle Gas-fired Power Station (Kudu);
- Coal –fired Power Station at Walvis Bay;
- Diesel Peaking Station at Walvis Bay;
- Lower Orange Small Hydro Stations; and
- Renewable energy including wind and solar power.

Each strategic alternative and its respective limitations and constraints is discussed in more detail below.

### *3.2.2 Combined Cycle Gas-fired Power Station (Kudu)*

The initial development concept for the Kudu gas field situated 170 km offshore on the south-west coast of Namibia was based on supplying gas to an 800 MW base load power station developed and operated by NamPower, with electricity in excess of Namibia's requirements being absorbed by the South African market. Progress with Kudu remains slow due to the ongoing disagreement on key commercial terms between the fuel supply developer and operator, the owner and off-takers. The main issue under discussion relates to price and forex risk (mismatch between foreign currency denominated gas and local currency electricity sales), which no parties to the agreement are currently willing to take. The project had initially relied heavily on the bulk balance of off-takers, as not all of the envisaged 800MW would be needed for Namibia during the first years of operation. However, as Namibian consumption is increasing, the requirement for a bulk off-taker has become less evident. It is anticipated that the government will have to get involved for the project to materialise (this involvement may be through legislation and/or financial). Its willingness to do so appears quite high, also given the sheer potential of this project to address power supply issues through the use of domestic resources and to form a stepping stone towards the creation of a hydrocarbon sector in Namibia. However construction of the project is estimated at four years with commercial operations targeted for 2013. (1)

*Limitations and Constraints of Gas*

The following limitations and constraints make the use of natural gas in this instance less attractive:

(1) Source: FitchRatings for Namibia Power Corporation (Proprietary) Limited, 20 April 2009.

- There are no gas fields close by to source such fuel in a cost effective manner;
- The options of Liquid Natural Gas (LNG) imports and re-gasification is prohibitively expensive on the scale required for Namibia, and other options, such as large scale Compressed Natural Gas (CNG) transport, are not yet proven technology;
- To utilise natural gas, a re-gasification terminal would be required which comprises large and expensive infrastructure;
- Economies of scale cannot be taken advantage of when bringing in new electricity generation technologies and this would result in the need for a drawn out and expensive development phase;
- The price of natural gas is linked to the international oil/gas market and thus price stability is unreliable, meaning that future prices may be unfeasible for the present project;
- The use of natural gas is very expensive and there is little security with regard to ongoing supplies; and
- Gas transportation vessels are typically large and the location of the proposed project would be a limitation to accept such vessels. (1)

### *3.2.3 Coal –fired Power Station at Walvis Bay*

The implementation of this 200MW-800MW coal-fired power project is foreseen through independent power producers (IPPs). NamPower is coordinating the environmental impact assessment study and final site study to ensure that all issues are addressed, and that boundaries on technology types to be employed are made clear. (2) The anticipated commencement date for the project is 2014.

*Limitations and Constraints of Coal*

One of the major drawbacks associated with coal-fired power stations is the atmospheric emissions from the combustion of coal. Modern coal-fired power station technology represents a major improvement on older technologies, and a more efficient combustion of fuel can be realised. A number of pollution abatement technologies can reduce the extent and type of emissions entering the atmosphere. Key emissions associated with coal fired power stations include particulates (PM10), $SO_x$, $NO_x$, carbon dioxide ($CO_2$) and various other elements which are emitted into the atmosphere via the flue stacks. From an air quality perspective, particulates, $SO_x$ and $NO_x$ emissions and other trace substances, including mercury, have the potential to impact on human health. (3) The main limitations to using coal include the following:

- Coal has one of the greatest waste problems of all energy sources. Waste includes sulphur and nitrogen oxides, organic compounds, heavy metals, radioactive elements, greenhouse gases and large amounts of ash;
- Consumes fossil fuels and is therefore not sustainable;

(1) Ninham Shand (Pty) Ltd, 2009.
(2) Source: FitchRatings for Namibia Power Corporation (Proprietary) Limited, 20 April 2009.
(3)Ninham Shand (Pty) Ltd, 2009.

- Contributor to climate change;
- Building a coal-fired power station is a lengthy and expensive process;
- The transportation of coal is very expensive and hence coal-fired power stations are located as close to the mines as possible in order to maintain their economic viability. Thus, coal-fired power stations are located inland and hence if wet cooling is used, power stations use considerable quantities of scarce water resources, or if dry cooling is used, the power stations are deemed relatively inefficient and water is used in relatively less quantities;
- Coal fields are mainly concentrated in South Africa's Mpumalanga (east of Gauteng) and Limpopo Provinces, which limits the location options for power stations in Namibia; and
- Requires expensive air pollution controls (eg particulate matter). (1)

### *3.2.4 Diesel Peaking Station at Walvis Bay*

The new 10-MW diesel-powered electricity generation power station will be constructed near the existing Paratus diesel-generator power station in Walvis Bay. (2) The construction of the diesel generator plant is scheduled to start in 2009, and is expected to be finalised in 2010.

*Limitations and Constraints of Diesel*

Diesel-powered electricity generation power station can be used to produce limited amounts of electrical energy and are generally used as emergency supply stations. The main constraints to using diesel are the following:

- High running charges exist due to costly price of diesel;
- Plants do not work efficiently under prolonged overload conditions;
- Generates small amount of power;
- Maintenance charges are generally high;
- Consumes fossil fuels and is therefore not sustainable; and
- Contributor to climate change. (3)

### *3.2.5 Lower Orange Small Hydro Stations*

This project is still in the feasibility study phase, and the border issues between South Africa and Namibia have not yet been fully resolved. However, it appears that the essential support for this project has been confirmed by the governments of South Africa and Namibia. The anticipated commencement date for the project is 2011.

*Limitations and Constraints of Small Hydropower Stations*

If poorly designed and/or operated, small hydropower stations can have similar disadvantages to large hydro-power, but on a smaller scale. The main

(1) Source: Nuclear 1 EIA: Final Scoping Report, Eskom Holdings Limited, Issue 1.0 / July 2008.
(2) Source: http://www.engineeringnews.co.za/article/nampower-plans-10-mw-diesel-powered-plant-in-walvis-bay-2009-03-24.
(3) Source: http://www.geocities.com/daveclarkecb/ElecGenProsCons.html#Diesel%20powered%20generators.

drawback is that to have a major global impact they will have to be very numerous.

### *3.2.6 Renewable Energy such as Wind and Solar Power*

Nampower established a target of 10 percent renewables capacity as a proportion of the total by 2011, focusing on selected technologies — including wind, solar and invader bush. A first target of 40MW should be met by 2011.

*Limitations and Constraints of Wind and Solar Power*

From an environmental perspective, wind- and solar-generated electricity are amongst the most attractive energy sources and Namibia has excellent potential for the use of both forms. However, these energy sources have constraints and limitations that make them less attractive for NamPower's current requirements, as follows:

Wind

- Wind-based electricity generation has a 35 percent capacity factor, which means that the supply will only be available 35 percent of the time, as dictated by natural climatic variances, events and cycles. The best wind conditions may not coincide with the peak demand time, which in Namibia is between 19:00 and 21:00 daily;
- To use wind-generated electricity as part of the energy mix it would require that a controllable backup thermal power station needs to be run inefficiently at reduced loads during times when wind conditions are favourable;
- Electricity can generally not be efficiently stored and can thus only be used as it becomes available; and
- Even when considering carbon credits, electricity generation by wind remains very expensive. (1)

Solar

- Solar-based electricity has a 50 percent capacity factor, which means that the supply will only be available 50 percent of the time, ie during daylight hours. The best solar conditions occur at midday, which does not coincide with the peak demand time in Namibia;
- Storage of solar-generated electricity is possible but is very expensive;
- To use solar-generated electricity as part of the energy mix would require that a controllable backup thermal power station needs to be run inefficiently at reduced loads during times when solar inputs are good;
- Even when considering carbon credits, solar electricity is significantly more expensive than thermally generated electricity; (2)
- While the panels are environmentally benign once they are built, the manufacturing process requires large amounts of energy;

(1) Ninham Shand (Pty) Ltd., 2008.
(2) Ninham Shand (Pty) Ltd., 2008.

- One less common, expensive, but highly efficient type of solar panel, gallium arsenide, contains toxins that need to be disposed of carefully at the end of the life of the panel; and
- Solar energy is spread relatively thinly. If a photovoltaic generator is to produce much electricity (ie several megawatts) it has to cover a large area. (1)

(1) Source: http://www.geocities.com/daveclarkecb/ElecGenProsCons.html#Diesel%20powered%20generators.

Chapter 4

# Proposed Development (including Project Alternatives)

# 4 THE PROPOSED DEVELOPMENT (INCLUDING PROJECT ALTERNATIVES)

## 4.1 INTRODUCTION

This *Chapter* provides a general overview of the technical features of the proposed Baynes Hydropower Project. The information in this *Chapter* was sourced from the Cunene Consortium's (1) Phase 1 and 2 Techno-Economic reports, presented to the Baynes Committee in October 2009 (Cunene Consortium, 2009).

Although transmission lines and access routes for construction materials and equipment to the Baynes project site do form a fundamental part of the overall hydropower development, transmission lines and access routes fall outside of the scope of this ESIA and will be described and assessed under separate ESIA processes.

## 4.2 OVERVIEW

The Kunene River Basin represents an area of 106,500km$^2$. 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.

The proposed Baynes Hydropower Project will potentially lead to the construction of a hydropower project on the Kunene River 40 km downstream of the Epupa Falls with an installed capacity of about 465 MW and an average energy production of 171 MW. The reservoir is to be constructed to achieve a dam water level of a maximum of 580 metres with a reservoir area of 57.67 km$^2$.

## 4.3 PROJECT DESCRIPTION

### 4.3.1 Project Location

The dam site location recommended by the Techno-Economic study is Site "E", which is the same site selected during the previous studies done by the NamAng consortium as an alternative to the Epupa Dam site (NamAng, 1995).

The reservoir is to be constructed to achieve a dam water level of a maximum of 580 metres. This to ensure the foot of the Epupa falls, which is at an

(1) The techno-economic study is being led by the Cunene Consortium which comprises the following companies: Construtora Norberto Odebrecht S.A., (consortium leader); ELETROBRÁS - Centrais Elétricas Brasileiras S.A.; Furnas Centrais Elétricas S.A.; and Engev

elevation of 580 metres, is not flooded, even at the scheme's full supply capacity. The reservoir at its full supply capacity has a surface area of 57.67 km², a volume of 2.043,08 hm³ and a length of 47km.

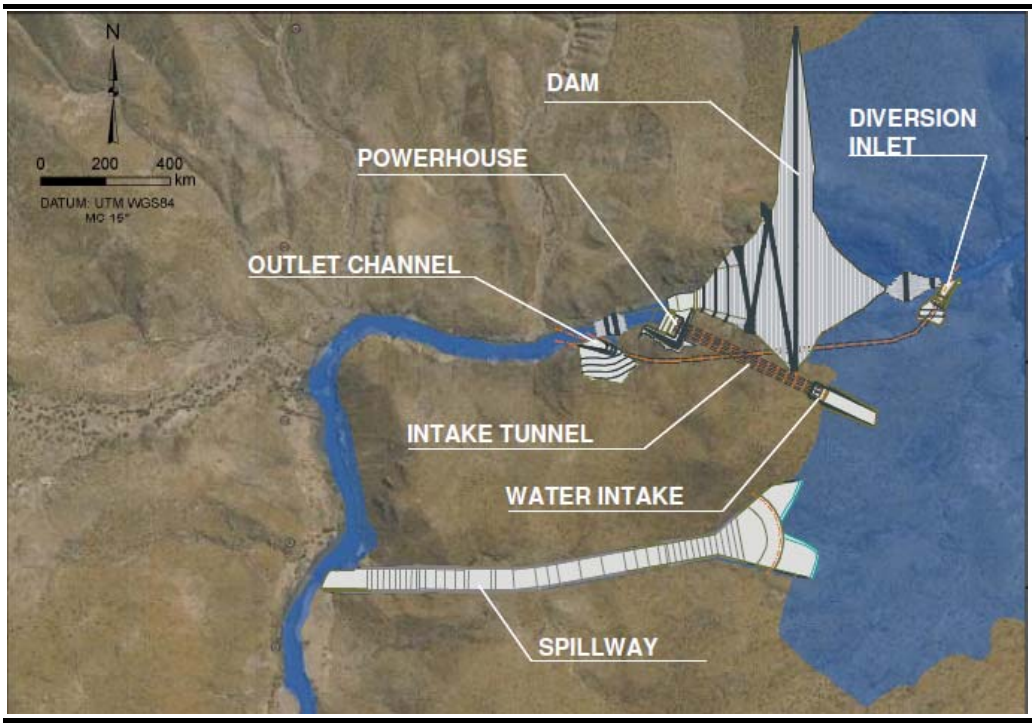
The location of the dam at Site "E" and its extent at the full supply level along the 580 metre contour is shown in *Figure 4.2*.

### 4.3.2 *Project Components*

The major project components are illustrated below in *Figure 4.1* and summarised in *Table 4.1*.

The layout at Site "E" has a river diversion through a tunnel located at the right river-margin; a hydraulic circuit with a powerhouse at the base of the dam wall on the Namibian side of the river, and a spillway to the south of the dam wall on the reservoir margin (*Figure 4.1*).

***Figure 4.1 Project Components***




Source: Cunene Consortium, 2009

***Table 4.1 Principal Characteristics***

| Principal Characteristics | Description |
|---|---|
| Installed Capacity | 465 MW |
| Average Energy Production | 171 MW avg. |
| Normal Maximum Water Level | 580.00 m |
| Normal Minimum Water Level | 540.00 m |
| Longo Term Mean Flow | 157 m³/s |
| Gross Head | 195.0 m |
| Reservoir Area | 57.67 km² |
| Reservoir Volume (at full supply capacity) | 2,550 hm³ |
| Dam | Rockfill, with a concrete lining |

| | |
|---|---|
| Spillway | Overflow type |
| Turbines | 3 Francis, Vertical Shaft |
| Energy Generation Cost | 112.00 US$/MWh |

The values provided in *Table 4.1* have been defined on the basis of existing data, and will be confirmed in the final phase (Phase 3) of the techno-economic study.

The selected structure arrangement for damming the Kunene River is by means of a rockfill dam with concrete lining, implemented jointly with an overflow spillway. This spillway, located on the Namibian bank, comprises a flume (chute) and is designed to accommodate the 1:10,000 year flood of 5,470 $m^3/s$.

The generation circuit, located on the Namibian bank of the river, is composed of an intake channel, water intake, penstock, powerhouse and tailrace. The powerhouse is of the sheltered type, equipped with three generators and three vertical-shaft Francis turbines. The anticipated installed capacity of the Baynes Hydropower scheme is 465 MW, divided into three generating units with Francis vertical shaft turbines. The approximate gross head defined by the Project is 195.0 m.

During the first phase of the construction works, the generation and spillway structures will be built on dry land, without affecting the natural flow of the Kunene River.

During the second phase of construction, the dam wall will be constructed and this will require that the Kunene River be diverted through a diversion tunnel. This tunnel has a radius of 6.50 metres and is designed to accommodate the 1:20 year flood. During this stage of construction, the construction site will be protected by upstream and downstream cofferdams. These cofferdams will be made up of rockfill with external sealing; the upstream coffer dam will have it crest at elevation 425 m, while the downstream coffer dam, located downstream of the tailrace, will have its crest at elevation 398 m.

The total duration of the construction period is 72 months. The predicted reservoir filling time is around 2.5 months.

## *4.4 PROJECT ALTERNATIVES INVESTIGATED*

### *4.4.1 Water Resources Utilisation*

The overall size of the Baynes Hydropower Project will be defined by the various water utilisation scenarios of upstream water users in the catchment of the Kunene River. Based on the analysis of the data and information collected during Phase 1 of the Techno-Economic study, the following configurations were considered:

- Case A0 (Base Case): Gove as a reservoir only, without generation, as per the 1969 Agreement between Namibia and Angola; also considering Matala and Calueque with current water withdrawals, also considering future scenarios should Matala be restored and the dam wall at Calueque be heightened;

- Case A1: Gove in operation, with its dam reconstructed and with an installed capacity of 60 MW, with Matala, Calueque, Ruacana, Baynes, and with upstream water withdrawal according to the volumes provided to the PJTC, as considered in Scenario 2 of the NAMANG (1) studies;

- Case A2: Gove in operation, with dam reconstructed and an installed capacity of 60 MW, with Jamba la Oma, Jamba la Mina, Matala, Calueque, Ruacana, Baynes and upstream water withdrawal according to volumes provided to the PJTC;

- Case B1: the same as Case A1, except for water withdrawal, to be considered according to the volumes indicated in the Plan of Use of Water Resources of the Kunene River of Angola;

- Case B2: the same as Case A2, except for water withdrawal, to be considered according to the volumes indicated in the Plan of Use of Water Resources of the Kunene River of Angola, up to the maximum admissible limit for the feasibility of the Baynes Project.

### *4.4.2 Site Location and Reservoir Levels*

In addition to the various water resource scenarios considered upstream of the Baynes site, the Techno-Economic team also considered three alternatives for the location of the hydropower station as well as three alternatives for the maximum level of the Baynes reservoir.

The three site alternatives are provided in *Figure 4.2* and are defined as:

- Site "Em", about 6 km upstream of Site "E";
- Site "E", corresponding to the site selected in the Feasibility Study done by NamAng (2); and
- Site "Ej", about 3 km downstream of Site "E".

The three alternatives for the maximum level of the Baynes reservoir included the following:

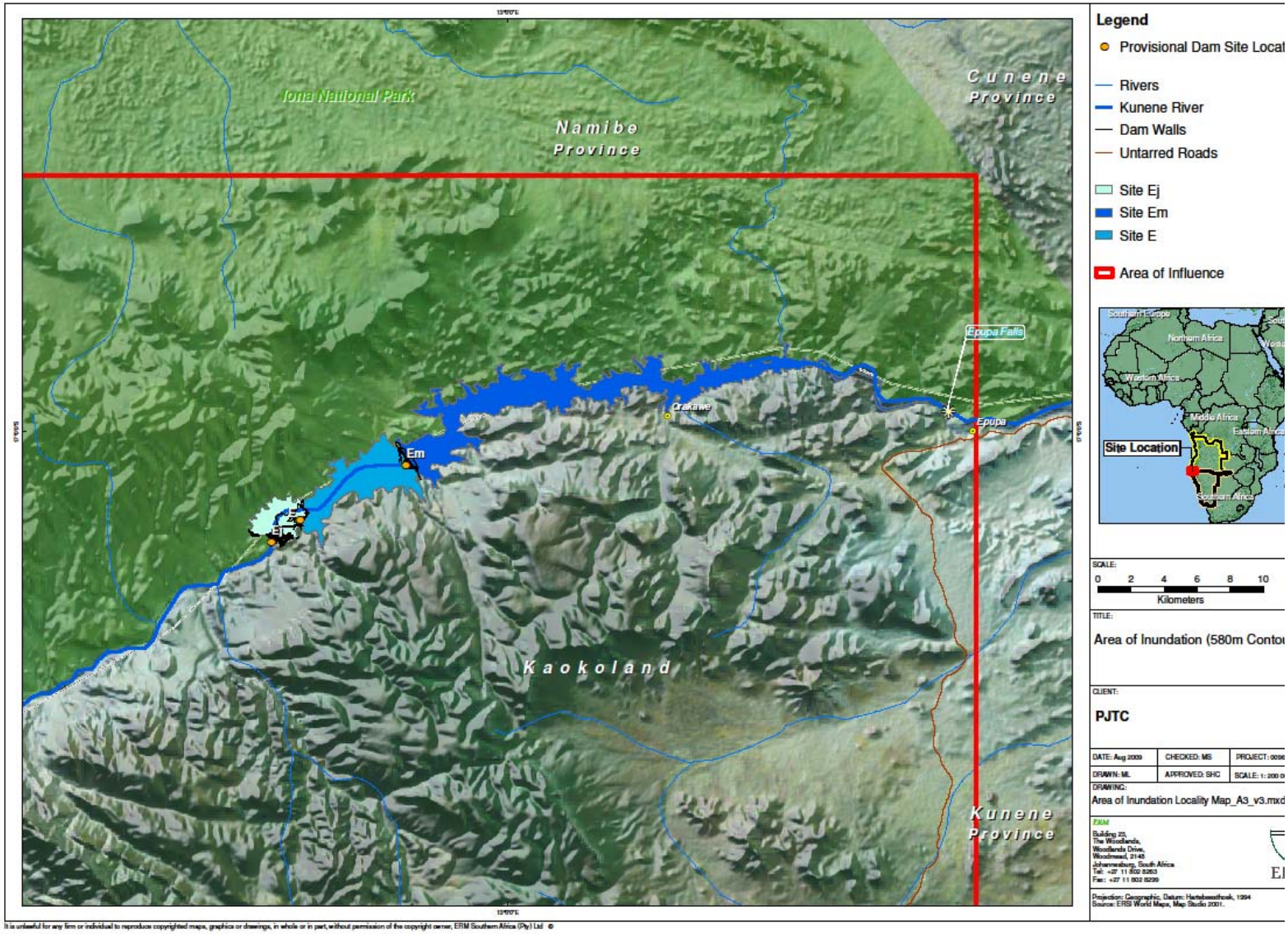
- elevation 580m;
- elevation 560m; and
- elevation 540m.

(1) NAMANG were the consortium involved with the previous Epupa (1995) study.
(2) NamAng is a consortium comprising Norconsult (Norway), SwedPower (Sweden), Burmeister and Partners (Namibia) and SOAPRO (Angola).

The 580m contour is the preferred alternative as it provides the most head for hydropower generation. In addition, the foot of the Epupa falls, which is at an elevation of 580 metres, will also not be flooded, even at the scheme's full supply capacity.

Given these various scenarios, the feasibility of the Baynes Hydropower Project will be analysed through cost-benefit analyses, in which the costs of power generation associated with the construction, operation and maintenance of the Baynes Hydropower Project will be analysed against the benefit associated with the produced energy, valued by the price of uniform energy (base-load operation mode) or divided in peak and off-peak levels (peaking operation mode) for the several alternatives simulated.

*Figure 4.2* *Area of Inundation: Site Ej, Site Em and Site E*



Based on these analyses, the Cunene Consortium will define, together with the PJTC, which of the configurations of the Kunene River described above should be adopted for the dimensioning of the Plant. The two optimisations of Baynes (“base-load" and "peaking") associated with this configuration will then be reassessed through economic analyses, for two alternative scenarios, the first one based on the price of power sales, and the other concerning water withdrawal. Following these analyses, the final alternative for the sizing of the Project will be selected.

Finally, the financial evaluation of the Project will be made considering commercialisation hypotheses for the energy produced by the Baynes Project. At this stage, operation of the power plant integrated into the Namibian and Angolan systems will be simulated, considering 20 and 30-year horizons.

Chapter 5

# The Receiving Environment – Physical and Biological

# 5 THE RECEIVING ENVIRONMENT – PHYSICAL AND BIOLOGICAL

## 5.1 INTRODUCTION

This *Chapter* provides a description of the environmental baseline of the proposed Baynes Hydropower Project, focussing on the 340km lower Kunene River and its surrounds that stretches between the Ruacana Falls and the Kunene River mouth in the vicinity of Foz do Cunene. This baseline is based primarily on a review of available secondary information.

The Kunene River Basin is 106,560km$^2$ in size of which 92,400km$^2$ is in Angola and 14,100km$^2$ in Namibia and stretches from the Bie Plateau in the Angolan highlands to the northern extent of the Namib Desert and associated gravel plains bordering the Atlantic Ocean.

The Kunene River is 1,100km long, it rises in the highlands of south-western Angola (near Huambo) and flows southwards through southern Angola for 660km to Calueque where it turns westward passing through the Namib desert for 390km. At Ruacana Falls, the river turns sharply west forming the border between Angola and Namibia.

The upper and middle reaches of the Kunene River are made up of an ancient drainage system, at its confluence with the Angola-Namibia border at the Ruacana Falls, the Kunene River enters a newer river channel formation created through backward erosion from the coast.

From the Ruacana Falls, the Kunene River forms an east-west linear oasis of permanent freshwater across the northern Namib Desert before reaching the Atlantic Ocean. Approximately 80km west of the Ruacana Falls, the Kunene enters its gorge tract through the Zebra and Baynes mountains before reaching the 30 metres high Epupa Falls. After the falls the River enters a gorge that cuts through the Baynes and Hartmann Mountain range before spilling out into the Namib Desert where it is generally small in volume before flowing into the Atlantic Ocean at the Kunene River Mouth.

### 5.1.1 *Limitations to the Environmental Baseline*

The secondary information available for this baseline with respect to the Angolan side of the proposed Project Area was largely outdated and in some cases no information was available. As such, descriptions are based on recent available information for the Namibian side of the Project Area. These areas of uncertainty will be addressed through a series of specialist studies that will be undertaken as part of the impact assessment phase (Phase 2) of this study.

## 5.2 TOPOGRAPHY AND GEOMORPHOLOGY

The upper and middle Kunene belongs to an ancient drainage system that developed prior to the formation of the African continent. At its confluence with the Angola-Namibia border, the Kunene River leaves the ancient drainage system of its upper and middle reaches and enters the newer lower river channel formation created through backward erosion from the coast and ending at the Ruacana Falls. Prior to the formation of the Lower Kunene, the Middle Kunene formed an inland delta area, similar to the present day Okavango delta in Botswana.

From the Ruacana Falls, rocky cliffs, wind-stripped plains and dune-fields mark its progress, on either side of the river, through the hyper-arid desert. The river is typically confined to rocky gorges for most of its 340km journey along the border of Angola and Namibia.

The topography consists of hill and mountain features, the most important of which are the Zebra Mountains interspersed with comparatively level terraces leading to rocky ridges.

The following land systems are in evidence in the Lower Kunene River area:

- steep hillslopes;
- colluvial footslopes;
- deep cut river gorges or the main river and tributaries;
- intermittent stream courses and ground water bush lands;
- Kunene riparian zone;
- the Kunene River;
- desert with Barchan sand dunes (Namibian side);
- aeolian sand deposits (scree slopes and cones) (Namibian side); and
- rocky plateaux (Angolan side).

From a geomorphological point of view, the Lower Kunene can be divided into the following sections:

- Ruacana-Epupa Falls;
- Epupa Falls-Marienfluss; and
- coastal plain including:
  - the Marienfluss confluence area;
  - the desert section; and
  - the Kunene River mouth area.

The Lower Kunene River has some common geomorphological features which are characteristic for all three main sections. These features are all related to its geological and recent development:

- The Kunene River is confined to a stable bed-rock channel, controlled by rock structure and tectonic features from the Ruacana Falls to the coast.

- The River channel is stable with respect to morphological changes caused by fluctuating water and sediment discharges.

- The longitudinal river profile is characterised by a "pool and riffle" morphology.

- At the thresholds, the river channel is often less pronounced and splits into several branches forming upstream islands of sandy bed-load material and rocky islands at the rapids proper.

- Discharge and water level variation over the season are high. In areas of flat terrain the river floods the rock channel and deposits coarse suspended (sand) by overbank sedimentation.

- The local contributing areas are furthermore small, with only short intermittent streams draining into the main river.

- The sediment residence time is long in the seasonal channels, which in some cases is indicated by weathering crusts which have developed on the surface of the sediment deposits.

- The seasonal (ephemeral) stream courses function as ground water aquifers and are thus important elements in the landscape in spite of the limited surface run-off.

## *5.3 GEOLOGY AND SOILS*

Due to the topography of the area, only very skeletal soil has developed in the lower Kunene River except in areas where original soil mantle persists below the Ruacana Falls, at Swartbooisdrift and south of the Epupa Falls.

This soil is of a poor quality (sandstone and lithosols) restricting the use of the land for agriculture and also influencing the type of vegetation in the area.

The soil along the route can be summarised as the following:

- steep hillslopes - residual (doloritic or acidic meta sediment) rocks and skeletal soils;
- colluvial footslopes - red/brown coarse textured colluvial soils;
- intermittent stream courses and alluvial fans - river sand;
- Kunene riparian zone - recent alluvium, stratified; and
- Kunene River - sand and rocks.

Within the lower most reaches of the Kunene River Mouth salt marshes exist which are maintained by salinity of the soil rather than tidal intrusion.

## 5.4 CLIMATE

Namibia has a dry climate typical of a semi-desert country where droughts are a regular occurrence. Usually days are warm and very hot, while nights are cool.

In general, the climate in the Namibe and Kunene provinces in Angola can be classified as tropical wet and dry (savannah) climate, influenced by the high altitudes. The climate in the Project area is classified as semiarid (tropical steppe) to arid (desert) climate.

### 5.4.1 *Rainfall*

The entire lower Kunene region is characterised by an arid climate with low annual rainfall. The average annual rainfall ranges from 350mm in the east (Ruacana Falls) to 50mm on the coast at the Kunene River mouth. Rain in Namibia and Angola usually falls during the summer. The rainy season lasts from October to March with the main rainy season between February and March. The regional variation in rainfall is well reflected by the vegetation pattern and land use.

### 5.4.2 *Fog*

Fog is a major source of moisture for the ecosystem living within the desert/semi-desert and the Atlantic Ocean interface that characterises much of the Namibia and Southern Angola coastline. The approximate number of fog days per year in the lower Kunene River range from one to five in the east to 50-75 days in the west.

### 5.4.3 *Temperature and Humidity*

The annual average temperature with the lower Kunene is 19-20°C on the coast and 21-22°C inland towards the Ruacana Falls. Extremely high temperatures (in excess of 40°C) are common in this region particularly during the summer months.

The relative humidity in the lower Kunene region during the most humid months is 90 percent while relative humidity during the least humid months ranges between 10 percent in the east to 50 percent in the west.

### 5.4.4 *Evaporation*

Average annual rates of evaporation in the lower Kunene region range from <2,400mm at the coast to 3,000mm inland.

## 5.5 HYDROLOGY

### 5.5.1 Surface Water

The Kunene River flows south and then sharply west from its source in the Angolan highlands to the Atlantic Ocean approximately 1,100km away. The Kunene is the only perennial river on the Atlantic coast of southern Africa between the Orange River and the Cuvo River near Porto Amboim in Angola.

The river rises on the Bie Plateau (32km northeast of Huamabo) and flows south towards Chiamelu. The upper Kunene cuts its way through a steep granite bed and is characterised by several rapids caused by a rough river bed comprised of rocks, stones and pebbles.

The river leaves the granite uplands at Matala, falling sharply before entering the Matala Dam. The dam raises the river by approximately 8m for hydroelectric power generation. From Matala Dam, the Kunene enters the Northern Kalahari Desert forming the eastern border of the Bicuari National Park. This section is characterised by a wide floodplain and is dominated by calcium-rich sediments.

To the south of Mupa National Park the Kunene turns to the southwest before reaching the Angola-Namibia border and the Ruacana Falls where it falls 70m. At the Ruacana falls, the river turns sharply west forming the border between Angola and Namibia.

Approximately 80km west of the Ruacana Falls, the Kunene enters its gorge tract through the Zebra and Baynes mountains. In this gorge tract are the Epupa Falls, more than 30 metres in height. The Kunene then flows from the Baynes Gorge into the Namib Desert, where it generally has a small volume, before emptying into the Atlantic Ocean. The river's mouth is a fluvially-dominated system with limited seawater intrusion; this prevents the development of a typical estuarine environment at the mouth.

*Discharge*

The Kunene River is a warm-water river, with highly variable annual flow volumes differing as much as 14-fold between high and low years. During any given year, variation in flow can be as much as 11-fold between high flow in April and low flow in October. The mean annual runoff of the Kunene River at its mouth (190km downstream of the proposed Baynes site) is 5,500 $Mm^3$ per year.(1)

*Water Quality*

The Kunene River is relatively unpolluted and the water quality is considered to be good, with a low concentration of phosphorus as well as other nutrients.

(1) Nakayama, Mikiyasu (2003).

The natural supply of phosphorus to surface waters emanates from weathering of minerals within the catchment. When released from the soil and bedrock its reactive chemical forms (o-phosphate) are rapidly taken up by photosynthesising plants for subsequent incorporation into the biomass and subsequent transport through the food chain. Therefore, most of the biologically available phosphorus is stored in organic matter. The cycling of phosphorus to primary producers is mainly from leaching and decomposition of dead organic matter (detritus). Phosphorus is always mineralised as phosphate ions from one of several organic forms. In arid regions with monsoon rains, phosphorus is released in the wet season when mineralisation is most intense. In the absence of anthropogenic disturbance the highest concentrations of this nutrient prevail during spates (floods or heavy rains). This pattern implies that the overall transport occurs during high flow. However, after extended flooding, retention is high due to absorption of phosphorus by soil particles.

Dissolved and coloured substances as well as suspended particles in the water will absorb and scatter the insolar radiation and consequently influence the photosynthesis of the rooted vegetation as well as that of phytoplankton and periphyton. In river water with high turbidity, such as that of Kunene, photosynthesis occurs in the upper meter of the water mass, whereas the phytoplankton algae, due to turbulent mixing are distributed about evenly between the bottom and the water surface.

### *5.5.2 Groundwater*

The seasonal (ephemeral) stream courses do, as indicated by the vegetation pattern, function as ground water aquifers and are thus important elements in the landscape in spite of the limited surface run-off.

## *5.6 ECOLOGICAL RESOURCES*

### *5.6.1 Vegetation*

The vegetation reflects the arid nature of the area with open woodland (Mopane Savanna) Acacia and Mopane trees *(Acacia/ Commiiphora and Colophospermum mopane)* predominating the steep hill slopes and the colluvial foot slopes. Riparian woodland of various species and composition extend from Ruacana to Angola through the Project Area.

The vegetation of the lower Kunene Region falls within three main biomes:

- the Namib Desert;
- the Nama Karoo; and
- the Tree and Shrub Savannah.

The dominant vegetation types include Namib grasslands in the west (confined to the Namib Desert and associated gravel plains) and sparse shrublands, grasslands and woodlands for the remainder of the region.

Riparian and marginal vegetation (mainly *Phragmites*) is confined to narrow strips along the riverbank. Where the river widens and braids into several channels, or where mist generated from waterfalls creates a relatively humid environment, riverine vegetation occurs in profusion. *Hyphaene* palms are common and abundant at Epupa. On surrounding hillsides, mopane and *Commiphora* dominate.

### *5.6.2 Aquatic Fauna*

*Fish*

The lower Kunene River has a rich diverse fish species, of which seven species (12 percent) are endemic. The area upstream from the Epupa Falls has relatively high species diversity, ranging from rheophilic species (ie demanding high content of oxygen in the water) to species preferring gently flowing or standing water. *Mesobola brevianalis* occur in large numbers as well *Synodontis* spp., *B. lateralis* and *O. macrochir*.

The species composition in the gorge downstream from Epupa is less diverse. The most common species found are *Barbus mattozi, Micralestes acutidens, Schwetochromis machadoi* and *T. buysi*. The area to the east of Foz do Cunene and the Kunene River Mouth is dominated by *Mugil cephalus.*

Large numbers of mullet (Family: Mugilidae) are present from Foz do Cunene up to the Kunene River mouth. Freshwater fish of the families Cichlidae (*Tilapia rendalii, Oreochromis andersonii, Oreochromis macrochir, Thoracochromis buysi, Serranochromis macrocephalus*), Cyprinidae (*Labeo ansorgii, Barbus trimaculatus, Barbus mattozi*), Hepsetidae (*Hepsetus odoe*), Mochokidae (*Synodontis* spp), Schilbidae (*Schilbe intermedius*), Clariidae (*Clarias gariepinus*), Mormyridae *(Marcusenius macrolepidotus, Mormyrus lacerda*) and Characidae (*Micralestes acutidens, Brycinus lateralis*) are also found at the Kunene River mouth.

The presence of Mochokidae, Shilbeidae, Cyprinidae, Hepsetidae and Mormyridae supports the fact that the Kunene River mouth experience little to no saltwater intrusion, as these fish are sensitive to saline water.

*Invertebrates*

The River Prawn (*Macrobrachium vollenhovenii*) is common between the confluence of the Marienfluss (about 70km inland) and Foz do Cunene near the river mouth. The oyster *Etheria eliptica* is also found in the Kunene River.

### 5.6.3 *Herpetofauna (Reptiles and Amphibians)*

Reptiles appear to be common in the area but have been poorly studied. At least 72 reptile species occur in the Baynes area. However, further studies are required to better document the reptile and amphibian life on the Kunene River. Evidence suggests that the Kunene River has a rich frog fauna in the upper Kunene in Angola however there is no evidence of this fauna in the lower areas in Namibia. (1)

A total of 13 amphibian species have been recorded in the Baynes area. Furthermore, at the Kunene River Mouth the Reptiles including Nile Crocodile Crocodylus Niloticus, Nile Monitor Varanus Niloticus, Nile Soft-shelled Terrapin Trionyx Triunguis, African Rock Python Python Sebae and the Green Turtle Chelonia Midas have been documented. (2)

During a study in 2001 a group from the University of Cape Town recorded the following reptiles (*Table 5.1*) close to the Kunene River Mouth. (1)

***Table 5.1 Reptiles***

| **Common Name** | **Scientific Name** |
|---|---|
| Nile Crocodile | *Crocodylus niloticus* |
| Green Turtle | *Chelonia mydas* |
| Nile Soft-shelled Terrapin | *Trionyx triunguis* |
| Horned Adder | *Bitis caudalis* |
| Western Rock Skink | *Mabuya sulcata* |
| Reticulated Desert Lizard | *Meroles reticulates* |
| Desert Plated Lizard | *Angolosaurus skoogi* |
| Web-footed Gecko | *Palmatogecko rangei* |
| Kaokoveld Namib Day Gecko | *Rhoptropus biporosus* |

### 5.6.4 *Mammals*

There has been a reduction in the number of almost all mammals since 1980 due to human activities (including the civil war in Angola and poaching) and a dry period in the 1990s. hree species are endemic to the area: the mountain ground squirrel, the Kaokoveld dassie and the black-faced impala. The wild dog is now considered extinct locally whilst hippopotamus are still occasionally found upstream from Epupa. The Epupa studies relied on data from 1980 to 1995 which may not accurately represent the types and status of mammals in the region and will need to be confirmed. However the following mammals were identified:

Limited distribution:

- Kaokoveld dassie (*Procavia welwitschii)*;
- mountain zebra (*Equus zebra hartmannae)*;
- black-faced impala (*Aepyceros melampus petersi)*; and
- dik-dik (*Madoqua kirkii)*.

(1) Curtis B *et* al, 1998.
(2) NACOMA, 2009.

Endemic:

- mountain ground squirrel (*Xerus princeps)*;
- Kaokoveld dassie; and
- black-faced impala.

Sporadic or considered extinct:

- wild dog *Lycaon pictus*; and
- Hippopotamus*, H. amphibius* (upstream of Epupa).

During a study in 2001 a group from the University of Cape Town recorded the following mammals (*Table 5.2*) close to the Kunene River Mouth. (2)

***Table 5.2 Mammals***

| Common name | Scientific Name |
|---|---|
| Gemsbok | Oryx gazelle |
| Springbok | *Antidorcas marsupialis* |
| Black-backed Jackal | *Canis mesomelas* |
| Brown Hyena | *Hyena brunnea* |
| Cape Fur Seal | *Arctocephalus pusillus* |

### *5.6.5 Birds*

There are thought to be 379 species of birds occurring along the river, 62 of which are on the IUCN Red List as being endangered or vulnerable. The highly localised Cichladusa ruficauda and Estrilda thomensis are associated with the riverine palms and thickets. (3) The bird species with the lower Kunene region can be classified according to their associated habitat.

*Dry Woodland Habitats*

These woodlands vary considerably in height and density, but are generally extensive and have a poorly developed grass layer dominated by annual species. Large tracts of Mopane woodland have been altered through being cleared for agricultural purposes (especially on the Angolan side of the Kunene River) as well as tree cutting for domestic construction purposes. Bird species richness is relatively high (174 species, 45.9 percent) however no species are uniquely associated with these habitats. Many of the species occurring here are often more common in the riparian woodland and *Salvadora* thicket habitats. Whitebrowed Sparrow-Weaver, Monteiro's Hornbill, Carp's Black Tit, Herero Chat, Whitetailed Shrike and Violeteared Waxbill are characteristic of this habitat type.

(1) Anderson *et al, 2009*.
(2) Anderson *et al,* 2008.
(3) Simmons *et al*, 2001.

*Open Grassland and Shrubland Habitats*

These habitats occur in two distinct positions within the main land systems. On the steep slopes of hills the shallow soils are often covered by scattered shrubs and perennial grasses. Rock exposure constitutes approximately 50 percent of the cover in these areas and large trees are scarce. Species characteristic of these up-slope grass and shrublands include Sabota Lark, Rock Bunting and Larklike Bunting.

The best formed grassland habitats are found in drainage outwashes and gravel plumes at the junction of the base of the colluvial footslopes and the riparian zone. These areas are heavily utilised by livestock throughout the year and are generally denuded of grass cover within a few weeks of the end of the wet season. The heavy use by livestock favours species preferring open habitats and species such as Crowned Plover, Temminck's Courser, Dusky and Red Capped Lark. A large number of species (141, constituting 37.2 percent of the species recorded in the study area) were observed in these habitats.

*Dense Groundwater Bushveld*

In areas of relatively high water tables and along the margins of intermittent stream courses, the vegetation is dominated by dense thickets formed by *Salvadora persica.* These thickets provide important food source for livestock as well as for a variety of bird species when the thickets in fruit. 83 species (21.9 percent) were recorded in these habitats however none are uniquely associated with them. Rednecked Francolin is most closely associated with *Salvadora* thickets as these probably provide some of the safest breeding habitat for this species. Other species often recorded within these thickets include Redeyed Bulbul, Palewinged and Cape Glossy Starling and Bleating Warbler.

*Tall Riparian Woodland Habitats*

The tall riparian woodlands are found along the margins of the Kunene River are probably the most important habitats within the study area with some 219 species (57.8 percent) occurring here; of which 31 species occur only in these habitats. Riparian woodlands are also well developed in areas several kilometres away from the main river course. These woodlands have the highest species richness of all the Kunene River habitats and several localised species occur predominantly in these habitats. Species of particular interest and concern are Rednecked Francolin, Rufoustailed Palm Thrush, Cinderella Waxbill, Yellowbilled Oxpecker, Grey Kestrel and Olive Bee-Eater. Rufoustailed Palm Thrush are only found in *Hyphaene* stands and thickets and the remaining five species are most commonly recorded in or associated with riparian woodland habitats.

*Cliff and Scree Slope Habitats*

Nineteen bird species (5 percent), three of which are uniquely associated with cliffs were recorded in the Project Area. Cliff habitats are included here as they provide important breeding habitat for several species of birds, such as Black Stork, Black Eagle, Peregrine, Rock Martin, Barn Owl, Rosyfaced Lovebird and Rock Pigeon.

The upper sections of the steep hillslopes are dominated by unconsolidated scree and boulder rubble. Small shrubs and grassy patches are characteristic. Thirty species (8 percent) have been recorded on scree slopes. Although relatively sterile there are a number of species which prefer scree slope habitats. These include Rockrunner and Shorttoed Rock Thrush. No species are uniquely associated with scree habitats.

*Emergent Reed and Sedge Wetland Habitats*

Reed and sedge habitats vary considerably in size along the length of the river, from small pockets (<0.1 ha) of emergent vegetation on sand banks and river margins in the upper reaches of the river, to large monospecific *Phragmites* reedbeds and sedge swamps in excess of 10ha near the mouth. Seventy-one species (18.7 percent) of birds were recorded from these habitats, but only three are uniquely associated with reed and sedge wetlands. Rallids are common in the larger stands and species such as Moorhen, Black Crake and Purple Gallinule are characteristic. Several passerine species such as Cape Reed Warbler, African Marsh Warbler, Fantailed Cisticola, Common Waxbill and Red Bishop, all favour these areas as breeding habitats.

*Open Freshwater and Riverine Habitats*

This category of habitats includes all open freshwater habitats in the area of the mouth and all flowing and stagnant water habitats associated with the Kunene River in the Project Area. Forty-five species (12 percent) were recorded in these habitats, 11 of which only occur in this area. The relatively low productivity of the river in terms of benthic zooplankton and fish determines that both the species richness and density of species specialising in these habitats is low. Fish-eating species such as Pied, Giant and Malachite Kingfishers, Reed and Whitebreasted Cormorant and Goliath Heron occur along the entire length of the river from Ruacana to the mouth at low densities. Other species which occur in these habitats are African Pied Wagtail, Threebanded Plover, Common Sandpiper and Hamerkop.

*Sandy Beaches and Exposed Tidal Flats*

These habitats only occur to any extent in the area of the river mouth. Fifty species (13.2 percent) were recorded in these habitats of which 15 species occurred nowhere else in the system. The tidal flats are almost devoid of benthos and so both these habitats can be considered relatively sterile. The principle food source for wading bird species in these habitats are largely flies of various types. Species such as Whitefronted Plover, Chestnutbanded Plover

and a number of Palaearctic migrants such as Sanderling, Little Stint and Curlew Sandpiper, are characteristic of these habitats.

*Pelagic/Marine Habitats*

This unit includes the offshore and inshore environments associated with the immediate mouth of the river. All the species occurring in these habitats are regarded as marginal, small populations compared to their Namibian and sub-Regional populations. These include species such as Cape Gannet, Damara Tern, Crowned Cormorant, Cape Cormorant and pelagic tern species such as Common and Arctic Tern.

## 5.7 SPECIES OF CONSERVATION CONCERN

*Introduction*

This section relies on data collected during the Epupa studies undertaken in 1998. Much of this data will need to be verified and confirmed as part of the main ESHIA. However, it provides the best overview available for the study area. This information has been supplemented by information from the IUCN database to show species that are endangered in Angola and Namibia, although this does not mean these species necessarily occur in the Project Area.

*Vegetation*

Thirty-three taxa occur within the general area of the proposed Baynes dam site. Many of these, particularly *Acacia mellifera* subsp. *Mellifera, Euphorbia kaokoensis* and several species of *Commiphora* are abundant, sometimes dominant in the area. Each of these species can be found well beyond the proposed dam site area. No vascular plant species were found which are thought to be unique to the area, or which are believed to be Red Data-book species. None of the noted taxa are considered to be at risk from the building of the proposed dam.

***Table 5.3 Protected plants under the Nature Conservation Ordinance 1979 (Schedule 9), occurring in the Lower Kunene Hydropower Scheme Project Area***

| Species | Abundance in the Area |
|---|---|
| Alöe littoralis | uncommon |
| Hoodia parviflora N.E. Br. | common |
| Moringa ovalifolia Dinter et Berger | common |
| Pachypodium lealii Welw. | rare |

*Fauna*

Four species - the Kaokoveld dassie, *Procavia welwitschii*; the mountain zebra, *Equus zebra hartmannae*; the black-faced impala, *Aepyceros melampus petersi*: the dik-dik, *Madoqua kirkii* - have very limited distributions within the lower Kunene region.

Three species - the mountain ground squirrel *Xerus princeps*, the Kaokoveld dassie and the black-faced impala are endemic to the region.

At least 51 small mammal species were recorded with in the proposed project area, two are categorised as insufficiently known, two as rare, 41 as secure, one as low risk (near threatened), six as peripheral, one as vagrant, three as vulnerable, three as indeterminate. One species, the Spotted-necked Otter, *Lutra maculicollis*, is classified as indeterminate (endangered) and peripheral. No classification existed for at least 1 small mammal species; (some species have been classified in more than one category, thus the grand total exceeds 51).

*Birds*

Brown & Williams (1993) list all bird Red Data Species for Namibia. The following categories are provided:

- ***Endangered*** - species in danger of extinction in Namibia if causal factors resulting in population declines continue to operate.
- ***Vulnerable*** - species believed likely to move into the endangered category in the future if factors causing declines are introduced or allowed to continue to operate.
- ***Rare*** - species with small or localised populations which may decline if causal factors are allowed to operate.
- ***Amber*** - Species requiring regular monitoring because of low numbers, restricted distributions (including endemics and near-endemics), specialised requirements or because insufficient information is currently available to class them in one of the other categories.

Sixty-two bird species (of the 379 registered in the project area by Hines 1997) are listed as the Red Data species. Of these, 34 species are listed within the Amber category. The majority of the Amber category species occur marginally within the Project Area and do not have significant populations.

Ten species are categorised as Rare. Three of these include the Grey Kestrel, Rednecked Francolin and Yellowbilled Oxpecker. Egyptian Vulture is regarded as a vagrant, Marabou Stork is only an occasional and irregular wet season visitor to the area and the remaining species are either marginal to the main body of the population of the species (Greyheaded Gull) or are represented by small breeding populations which are likely to be insignificant in the broader species survival (Chestnutbanded Plover).

Thirteen species are categorised as Vulnerable. Rufoustailed Palm Thrush and Cinderella Waxbill are limited range species within the Kunene. Species such as Great White Pelican, Cape Gannet, Crowned Cormorant, Greater and Lesser Flamingo, Whiteheaded Vulture, Bateleur, Caspian and Damara Tern and Greyheaded Bush Shrike, are all represented by small, marginal populations which are insignificant in the broader sub-Regional context. The

Black Stork population is poorly known in the Kunene River valley but is likely to be small.

Of the 5 species categorised as Endangered all can be regarded as being represented by very small, marginal populations or are essentially vagrants to the Kunene system, as very little suitable habitat exists to support significant populations. Jackass Penguin, Saddlebilled Stork and Pel's Fishing Owl are all thought to be vagrants. Greatcrested Grebe occurs in small numbers and may breed at the mouth of the river but is a widespread species in the Southern African context and the Kunene population is therefore of little significance. Whitebacked Night Heron occurs along the length of the river from Ruacana to the mouth however this species is widespread in Africa.

In Angola and Namibia the following birds (*Table 5.4*) are indentified by the IUCN Red List as being critically endangered, endangered or vulnerable, while not all of these species can be found in the Lower Kunene River area it does indicate sensitive species in the area.

***Table 5.4 IUCN 2009 Listed Species - Birds***

| Critically Endangered | Endangered | Vulnerable |
|---|---|---|
| **Angola** | | |
| • *Diomedea dabbenena* (Tristan Albatross) | • *Laniarius amboimensis* (Gabela Bush-shrike)<br>• *Laniarius brauni* (Orange-breasted Bush-shrike)<br>• *Macrosphenus pulitzeri* (Pulitzer's Longbill)<br>• *Prionops gabela* (Gabela Helmet-shrike)<br>• *Sheppardia gabela* (Gabela Akalat)<br>• *Thalassarche chlororhynchos* (Atlantic Yellow-nosed Albatross)<br>• *Thalassarche melanophrys* (Black-browed Albatross) | • *Cossypha heinrichi* (White-headed Robin-chat)<br>• *Falco naumanni* (Lesser Kestrel)<br>• *Francolinus swierstrai* (Swierstra's Francolin)<br>• *Grus carunculatus* (Wattled Crane)<br>• *Lepidochelys olivacea* (Pacific Ridley)<br>• *Morus capensis* (Cape Gannet)<br>• *Ploceus subpersonatus* (Loango Weaver)<br>• *Torgos tracheliotos* (Lappet-faced Vulture)<br>*Trichechus senegalensis* (West African Manatee)<br>• *Trigonoceps occipitalis* (White-headed Vulture) |
| **Namibia** | | |
| • *Diomedea dabbenena* (Tristan Albatross) | • *Phalacrocorax neglectus* (Bank Cormorant)<br>• *Pterodroma incerta* (Atlantic Petrel)<br>• *Thalassarche chlororhynchos* (Atlantic Yellow-nosed Albatross)<br>• *Thalassarche melanophrys* (Black-browed Albatross) | • *Circus maurus* (Black Harrier)<br>• *Diomedea exulans* (Wandering Albatross)<br>• *Egretta vinaceigula* (Slaty Egret)<br>• *Falco naumanni* (Lesser Kestrel)<br>• *Grus carunculatus* (Wattled Crane)<br>• *Grus paradisea* (Blue Crane) |

| Critically Endangered | Endangered | Vulnerable |
|---|---|---|
| | | • Gyps coprotheres (Cape Vulture)<br>• *Lepidochelys olivacea* (Pacific Ridley)<br>• *Morus capensis* (Cape Gannet)<br>• *Procellaria aequinoctialis* (White-chinned Petrel)<br>• *Procellaria conspicillata* (Spectacled Petrel)<br>*Thalassarche chrysostoma* (Grey-headed Albatross)<br>*Thalassarche salvini* (Salvin's Albatross)<br>• *Torgos tracheliotos* (Lappet-faced Vulture)<br>• *Trigonoceps occipitalis* (White-headed Vulture) |

*Fish*

There are 64 species of fish are reported in the Kunene River with 58 reported in the lower Kunene River.

Scarce species present in the Lower Kunene River include *Pollimyrus castelnaui, Kneria maydelli, Barbus poechi, B. barnardi, B. radiatus, B. breviceps, Leptoglanis sp., Clarias stappersii, C. theodorae, C. liocephalus, C. ngamensis, Clariallabes* sp., *Tilapia sparrmanii, Sargochromis coulteri* and *Serranochromis thunbergi.* The low abundance of many of these species can be related to the absence of floodplain habitats in this stretch of the river (ie *P castelnaui, B. barnardi, B. radiatus, C. stappersii, C. theodorae, T. sparrmanii, S. coulteri*).

*Clarias theodorae* is listed in the Red Data Book of Fishes (1987) as rare. The species also occur in low numbers in the Kunene River, but due to the fact that the status of this species in other systems was not studied, it is assigned to the Not Evaluated (NE) category (IUCN, 1994).

*Brycinus lateralis* is listed in the SA Red Data Book of Fishes (1987) as rare, but this is as a result of its isolated occurrence in the Kwa-Zulu Natal province in South Africa. This species was sampled in abundant numbers in the Kunene River. *Brycinus lateralis* also occur abundantly in the Zambezi River and Okavango River systems. This species is therefore assigned to the Low Risk (LR) category (IUCN, 1994).

*Chetia welwitchi* are known from museum specimens only. The status of this species in the Kunene River is unknown. Although it was assigned to the Data Deficient (DD) category, it must be given the same protection as threatened taxa, at least until its status can be evaluated.

*Kneria maydelli*, *B. breviceps* and the *Leptoglanis* sp. can be regarded as very sensitive and they were therefore assigned to the Critically Endangered (CR)

category (IUCN, 1994). The area of occupancy is estimated to be less than 10 km$^2$. *Kneria maydelli* and *B. breviceps* has severely fragmented occurrence, while *Leptoglanis* sp. is known from one location only.

***Table 5.5 Classification of Kunene River fish according to Categories set by the IUCN (1994)****

| Species | SA Red Data Book - Fishes | IUCN |
|---|---|---|
| MORMYRIDAE | | |
| Marcusenius macrolepidotus | | LR |
| Hippopotamyrus ansorgii | | LR |
| Mormyrus lacerda | | LR |
| Petrocephalus catastoma | | LR |
| Hippoptamyrus discorhynchus | | NE |
| Pollimyrus castelnaui | | LR |
| KNERIIDAE | | |
| Kneria maydelli | | CR |
| CYPRINIDAE | | |
| Mesobola brevianalis | | LR |
| Barbus eutaenia | | LR |
| Barbus fasciolatus | | LR |
| Barbus mattozi | | LR |
| Barbus paludinosus | | LR |
| Barbus poechii | | LR |
| Barbus trimaculatus | | LR |
| Barbus unitaeniatus | | LR |
| Barbus afrovernayi | | NE |
| Barbus barnardi | | NE |
| Barbus bifrenatus | | NE |
| Barbus lineomaculatus | | NE |
| Barbus multilineatus | | NE |
| Barbus radiatus | | NE |
| Barbus kersteni | | NE |
| Barbus dorsolineatus | | NE |
| Barbus breviceps | | CR |
| Labeo ansorgii | | LR |
| Labeo ruddi | | LR |
| BARGRIDAE | | |
| Leptoglanis sp. | | CR |
| CHARACIDAE | | |
| Brycinus lateralis | Rare | LR |
| Micralestes acutidens | | LR |
| Rhabdalestes maunensis | | NE |
| HEPSETIDAE | | |
| Hepsetus odoe | | LR |
| DISTICHODONTIDAE | | |
| Hemigrammocharax machadoi | | NE |
| Hemigrammocharax multifasciatus | | NE |
| SCHILBEIDAE | | |
| Schilbe intermedius | | LR |
| CLARIIDAE | | |
| Clarias gariepinus | | LR |
| Clarias stappersii | | NE |
| Clarias liocephalus | | NE |
| Clarias theodorae | Rare | EN |
| Clarias ngamensis | | NE |
| Clariallabes sp. | | VU |

| Species | SA Red Data Book - Fishes | IUCN |
|---|---|---|
| MOCHOKIDAE | | |
| Chiloglanis sp. | | VU |
| Synodontis spp. | | LR |
| CYPRINODONTIDAE | | |
| Aplocheilichthys johnstoni | | LR |
| Aplocheilichthys katangae | | NE |
| CICHLIDAE | | |
| Oreochromis andersonii | | LR |
| Oreochromis macrochir | | LR |
| Schwetzochromis machadoi | | VU |
| Serranochromis angusticeps | | LR |
| Serranochromis altus | | NE |
| Serranochromis macrocephalus | | LR |
| Sargochromis coulteri | | VU |
| Thoracochromis buysi | | VU |
| Thoracochromis albolabrus | | VU |
| Tilapia rendalii | | LR |
| Chetia welwitchi | | DD |
| Pseudocrenilabrus philander | | LR |
| Sargochromis giardi | | NE |
| Serranochromis thumbergi | | NE |
| Tilapia sparmanii | | LR |
| MUGILIDAE | | |
| Mugilidae spp. | | - |
| Mugil cephalus | | LR |
| ELEOTRIDAE | | |
| Eleotris spp. | | - |
| GOBIIDAE | | |
| Awaous lateristrigu | | - |

*These categories are: extinct (EX), extinct in the wild (EW), critically endangered (CR), endangered (EN), vulnerable (VU), lower risk (LR), data deficient (DD) and not evaluated (NE).

*Invertebrates*

A report by the CSIR (1996) (RC-10) suggests the population of *M. vollenhovenii* in these lower reaches of the Kunene River to be geographically, morphologically and eco-physiologically distinct from other populations. This would then serve to increase the conservation and scientific importance of this population.

The conservation importance of the other two species sampled in the Kunene River can only be determined once they have been identified.

## 5.8 LAND-USE

The Lower Kunene River is considered of high wilderness and conservation value. In Namibia, the Kaokoveld is considered a high priority conservation area (IUCN) and the Mareinfluss is a potential World Heritage Site.

On the Angolan side of the Kunene, approximately two-thirds of the land adjacent to river is designated as part of the Iona National Park while on the

Namibian side the Kunene River mouth area falls within the Skeleton Coast National Park.

The area is very sparsely populated and the nearest towns to the Kunene are some considerable distance. Okangwati is the closest settlement and Opuwo is the closest town both of which are on the Namibian side to the Project Area.

The area adjacent to the banks of the lower Kunene River are utilised for small scale subsistence agricultural activities, but the majority of the land outside of the national parks is utilized by the local population for grazing where possible. Three registered communal conservancies, namely the Marienfluss, Orupembe Kunene River conservancies exist in the Project area. Tourism in the region is relatively common, although this is on a small scale, making use of the limited tourism infrastructure on offer within the conservancies and tourism concessions. The region has the potential to become more attractive to tourists generally in the future depending on accessibility (see *Chapter 6*).

*Iona National Park (Angola)*

Situated in the south-western corner of Namibe, between the Curoca and Kunene rivers, the Iona National Park is the largest conservation area in Angola of 15,150km$^2$. The protected area includes the mouth of the Kunene River, the extensive sand-spit and Baia dos Tigres and about 200km of Atlantic coastline.

The Iona National Park stretches from the coast, between Foz do Cunene and Foz do Kuroka, to the meridian line between Epupa and Erora. From here onward it follows several river beds until the Otjifengo Mountain, and further on until the Kuroka River. It follows this river, along its left bank, until the sea. Iona National Park was created under the name of Porto Alexandre National Park in 1944, with a much larger area than currently. It was renamed and given its present borders in 1964.

There are a variety of desert and semi-desert ecosystems in Iona National Park, including mobile dunes along the coast, calcrete plains,desert grasslands of perennial *Aristida* and *Stipagrostis*, arid montane shrubland and open woodland and arid savannah. *Welwitschia mirabilis* is common on gravelly substrates. (1) As a result of the rainfall gradient, the perennial grasslands in the park lead into *Acacia-Commiphora* semi-arid savannah and, further east, to mopane (*Colophospermum mopane*) woodland.

Of particular importance is that the park is contiguous with the Skeleton Coast Park in Namibia, which is itself contiguous with the Namib-Naukluft National Park so that all three protected areas form a continuous block covering some 1,500km of Namib Desert coastline and adjacent dunes. (2) The Himba are also reported to live and farm in the area.

(1) Huntley, 1974.
(2) Birdlife, 2009.

*Skeleton Coast National Park (Namibia)*

The Skeleton Coast National Park covers an area of approximately 17,400 km$^2$ extending from the Ugab River in the south approximately 500km to the Kunene River in the north. The landscape ranges from dunes to rocky canyons and extensive mountain ranges whose slopes are covered by a variety of plants which have adapted to the environment. The coast is generally flat, occasionally relieved by rocky outcrops. The southern section consists of gravel plains, while north of Terrace Bay the landscape is dominated by high sand dunes. The northern half of the park is a designated wilderness area. Notable features here include the clay castles of the Hoarisib River, the Agate Mountain salt pans and the large seal colony at Cape Fria.

The vegetation between the Ugab and Huab rivers falls within the Central Namib type, while that of north of the Huab is classified as Northern Namib. The vegetation is relatively sparse, the most common species being dollar bush, brakspekbos and the occasional stands of ganna. Over a hundred species of lichen grow on the plains and west-facing mountain slopes. Many of the plant and insect species of the sand dune systems depend on the thick sea fogs which engulf the coast for their moisture and windblown detritus from the interior for food. The dense fog and cold sea breezes are caused by the cold Benguela Current which flows offshore meeting with the extreme heat of the Namib Desert.

Mammals include oryx, springbok, jackal, ostrich and brown hyena, while elephants, black rhinos, giraffes and lions are found in the dry river courses. Black-backed jackal, brown hyena and the Cape fur seals are mainly found along the coast.

Large numbers of sea and shore birds are attracted to the area as a result of the nutrient-rich ocean off the Skeleton Coast Park. There are an estimated 15,000,000 birds moving through the area each year, and also a large number of endemic species. Some of the most common bird species to be seen include coastal birds such as avocets, flamingos, pelicans, cormorants, plovers and other small waders.

There are strict measures that are taken to preserve the ecology of the Park, and entry permits for casual visitors are only available for day trips between sunrise and sunset. The area in the northern region of the park is strictly off-limits to independent travellers and land access is only through fly-in safari operated by the official concessionaire or on a permit issued by the Ministry of Environment and Tourism.

Chapter 6

# The Receiving Environment – Socioeconomic

# 6 THE RECEIVING ENVIRONMENT – SOCIOECONOMIC

## 6.1 INTRODUCTION

This *Chapter* presents a description of the socioeconomic receiving environment within the proposed Project Area (lower Kunene River). The Project Area falls within three provinces across two countries: namely the provinces of Kunene and Namibe in Angola and the Kunene Region in Namibia.

The secondary information contained herein was sourced from the Epupa Baynes Feasibility study and EIA published between 1996 and 1998. Where possible, more recent and up-to-date information has been included. However, pending input from a full specialist study, the data herein should be considered as a preliminary account of the social baseline within the Project Area based on available information and statistics for the area. The results of the full social baseline survey will be presented in the draft ESIA.

## 6.2 THE HIMBA

### 6.2.1 Population and Migration Patterns

The Himba [(1)] [(2)] are a tribe of pastoralists who inhabit the Kunene Region in north-western Namibia and south-western Angola. [(3)] In 2001, the total population of the Kunene Region was 68,735. For the two constituencies which can be regarded as within the influence sphere of the Baynes Hydropower Project namely the Epupa and Opuwo Constituencies, the total population in 2001 was 34, 021 people with 13, 129 residing in the Epupa Constituency. The Himba are descendants of the Herero who now mainly live in central and eastern Namibia.

The Himba are semi-nomadic cattle herders who also breed sheep and goats. Cattle are a sign of wealth for the Himba and herd sizes can vary from 3-500 cattle. Young men aged between 12 and 25 are usually responsible for the cattle and will move them between cattle posts in the Koakoveld. Other members of the family may remain in permanent villages or only move at certain times of the year.

The Himba's semi-nomadic lifestyle allows them to optimise water and pasture land. At the driest times of the year (August - December), when circumstances do not allow use of inland water points, some households migrate to the Kunene River to obtain water and grazing for their livestock.

(1) Olfami K, 2008.
(2) Harring, 2001.
(3) UNHCR.

The Himba live most of the year in permanent villages which are spread out complexes of round wooden and mud huts, surrounded by fences and outbuildings.

### *6.2.2 Ethnicity*

The Himba have kept their ethnic individuality due to their relative isolation, however they are closely related to other ethnic groups, most notably the Herero who live in Namibia, Angola and Botswana.

Besides the Namibian Herero, the Himba are also related to the following Herero tribes in south west Angola:

- Zemba;
- Tyavikwa;
- Hakavona;
- Kuvale;
- Kwanyoka; and
- Ngendelengo.

The exact origins of the Herero peoples is unclear; however evidence suggests that they migrated south from central Angola during the 1600's and that the Himba emerged as a distinct tribe between eighty and one hundred fifty years ago.

### *6.2.3 Language*

The Himba speak a language called Dhimba (or sometimes Zemba) which is closely related to that of the Herero tribe. Their language is in the Niger-Congo group of the Bantu linguistic family.

### *6.2.4 Gender Roles*

Himba women perform most of the labour intensive activities such as milking the livestock, hauling water from the river, raising children, carrying firewood and constructing homes.

Despite the prominent role by Himba women in Himba society, they are not strictly matrilineal (ie land and ancestors traced through the maternal line). Instead every Himba tribe is a member of two clans, that of their mother and that of their father (bilateral descent). However, sons typically live with their father's clan but do not inherit their father's wealth; instead they inherit from their mother's brother (maternal uncle). Furthermore, a Himba woman will live with her husband's clan after marriage. This bilateral descent is unique, occurring in very few African tribes.

### 6.2.5 *Culture and Beliefs*

*Beliefs*

The Himba practice monotheism and ancestor worship. The Himba god is called Mukuru who created man, woman, and cattle from the same tree. Unlike most other religions, Mukuru does not have unlimited power and ancestors can also greatly influence the world and events. One of the duties of the male leader of the family is to maintain the ancestral fire, where he prays to and communicates with the spirits of his ancestors asking for their blessings. Whereas Mukuru is believed to control most physical elements of the world such as the land, water, and the weather, ancestors control more local concerns such as sickness or the condition of their cattle. For example, if someone falls ill, the Himba people believe that the ancestral spirits were somehow offended by the family's actions.

*Gravesites*

The Himba people place considerable importance on ancestral gravesites through which they express their relationship to the land. The gravesites act as a focal point for defining identity, social relationships and relationships with the land, as well as being a focal point in religious ceremonies.

Graveyards are normally located in such a way that there is some privacy, and most commonly near a water course. The proximity of graveyards underscores the permanence of villages. The graveyards are usually located within one or two kilometres of the villages and are usually near a river bed. Each Himba picks the spot for her or his grave and this site becomes a gathering place for extended clan relatives, who will come together annually in ceremonial rites to commemorate their dead ancestor. These gravesites are fundamental statements of identity, indicating where a person felt they belonged.

165 recorded graves are located along the river (which includes both the Angolan and Namibian sides of the river) between Epupa and Enyandi. Graves are more scattered along the river than in the hinterland where they are distinctly located to a limited number of graveyards.

### 6.2.6 *Lifestyle*

*Marriage*

The Himba are polygamous with one man often having multiple wives.

*Clothing and Body Decoration*

Himba females cover their skin in a red-coloured cream which is a mixture of butter, red ochre, ash, and various native herbs. This cream protects them from the sun, giving their skin a reddish-brown colour. To the Himba women, the brown colour symbolises the earth and the red colour represents blood

and life. This same mixture is applied to the hair which is also braided. In contrast to Himba girls and women, Himba men do not use the red ochre mixture.

Married Himba women wear ornaments on top of their plaited hair and a conch shell around their necks as a symbol of fertility. In addition, they often wear a leather plate with metal studs that hangs down their backs.

Traditionally Himba wear clothes made from goat skin and other hides, men wear loin clothes and women wear short skirts; however increasingly the Himba, in particular the men, are wearing western clothing.

*Diet*

The Himba maintain a simple diet of sour goat milk and goat meat. More recently, the Himba have begun supplementing their diets with a few vegetables. In addition, traditional home-brewed beer has also been augmented by liquor. Since the Himba economy requires little cash, it is seldom necessary to sell cattle in order to acquire money; the primary value of the cattle is cultural, representing power and wealth.

*Transportation*

Transportation is ordinarily by walking, or hitching a ride. Roads in the area are of a poor quality and even in 4x4 vehicles, travel times can be extensive.

*Communication*

When the Himba need to communicate or send messages to cattle posts, this is traditionally undertaken by messengers, usually a boy, who will walk to the destination with an oral message. Depending on the distance, he will stop at cattle posts and villages along the route for food and water.

*Livestock*

Livestock for the Himba are a sign of wealth and are their most important possession. Livestock is exchanged as part of marriage contracts and in the past bartered for other commodities such as maize meal, clothes and blankets as well as alcohol and other basic commodities.

## *6.3 ADMINISTRATIVE/NON-FORMAL INSTITUTIONS AND SOCIAL NETWORKS*

### *6.3.1 Government Administration*

*Angola*

Angola is a multiparty democracy. Its executive branch is headed by the president, popularly elected for a five-year term, who serves as both chief of state and head of government. The prime minister and council of ministers are

appointed by the president. The president has executive powers and joint legislative power with the National Assembly.

Angola has a 220-seat National Assembly, whose members are elected by proportional vote for four-year terms. The assembly has joint legislative power. Administratively, the country is divided into 18 provinces.

The Angolan legal system is based on the Portuguese civil law system and customary law; which has been modified to accommodate political pluralism and increased use of free markets. The judicial branch of government is a supreme court and judges are elected by the president.

*Namibia*

Namibia has a stable multi party parliamentary democracy. The politics of Namibia takes place in a framework of a presidential representative democratic republic, whereby the president of Namibia is elected to a five-year term and as the head of state. The head of government is the Prime Minister and members of the cabinet (government) are appointed by the president from the National Assembly.

Executive power is exercised by the government. Legislative power is vested in the government and the bicameral Parliament, the National Assembly and the National Council. The judiciary is independent of the executive and the legislature, whereby Judges are appointed by the president on the recommendation of the Judicial Service Commission.

There are 13 administrative districts in Namibia and 102 constituencies.

Namibia is a member of both the United Nations and the Commonwealth of Nations.

### *6.3.2 Other Institutions/Groups in the Village*

Under Namibian and Angolan law, customary law is recognised to the extent that it does not conflict with state law. Decision-making is therefore in the hands of chiefs, who work closely with counsellors and wealthy males. These traditional authorities therefore exercise political and legal authority over their communities.

There are currently thirteen Himba chiefs, 13 Tjimba Chiefs and 7 Herero Chiefs in the Kaokoveld, each theoretically of equal rank and responsible for a particular area occupied by a well-defined group of people with traditionally defined grazing rights. Five to seven counsellors, generally wealthy older men, assist each chief.

The Himba chiefs in Namibia are paid by the Namibian government to perform legal and political duties in Namibia as allocated under the Namibian constitution. These chiefs adjudicate any disputes about customary land or

grazing rights and their judgment is final, ordinarily not reviewable by Namibian courts, giving the Himba's substantial powers of local self government within the Namibian state.

The Himba in Angola also use chiefs to settle disputes and do not apply to Angolan courts to settle disputes.

## *6.4 LAND USE AND LAND TENURE*

Namibia is divided into 13 regions over an area of 824,116 km$^2$ of which 43 percent is allocated to freehold land where utilisation is predominantly commercial farming while 39 percent of the area serves as communal land. This means that it is land occupied and used by community members who are subject to rules or laws of that particular community, and marked by a collective ownership and control of goods and property. The remaining 18 percent is owned by Government, comprising mainly environmentally protected areas (conservancies) and areas set aside for mining activities and exploration. (1)

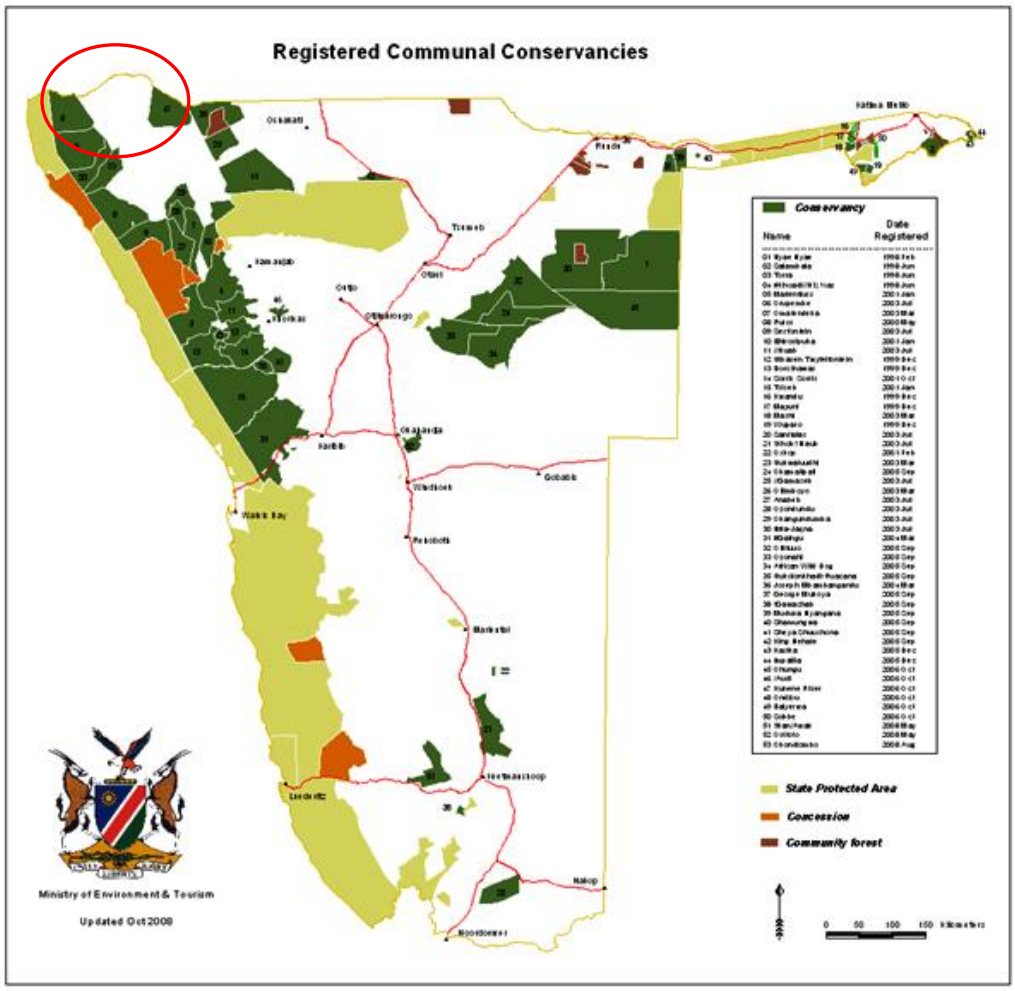
The Community Based Natural Resource Management (CBNRM) Programme in Namibia is based on policy and a legal framework which grants rights over wildlife and tourism management to communities on their lands once they are organized as "conservancies". Conservancies are multiple-use zones with legal status, registered with the authorities (Ministry of Environment and Tourism), where residents currently continue farming but collectively manage wildlife in order to benefit both from better natural resource management practice, and from capturing tourism and natural resource revenues.

Registered Communal Conservancies in Namibia are provided in *Figure 6.1*. Of relevance to this project are conservancies 5 (Marienfluss), 6 (Orupembe) and 47 (Kunene River).

Tourism in the region is relatively common. The CBNRM programme in the registered conservancies in the region has also meant that ecotourism in these areas is established and controlled. The Mareinfluss conservancy has three joint venture tourism enterprises and a campsite, the Kunene River conservancy has a joint venture agreement with the Kunene River Lodge and the Orupembe conservancy has a joint venture agreement for game viewing in the conservancy, premium hunting, own use hunting and craft production (2). The Epupa falls, which fall outside of a conservancy act as a tourist attraction and tourism facilities in this area include established campsites and a lodge. The region has the potential to become more attractive to tourists generally in the future depending on accessibility.

(1) Ministry of Environment and Tourism – Protected Areas of Namibia.
(2) Namibian Association of CBNRM Support Organisations.

*Figure 6.1 Registered Communal Conservancies in Namibia*




Source: Ministry of Environment and Tourism (Namibia)

The Himba hold land communally, different families and clans derive land rights from respected customary law administered by chiefs and counsellors. Communal land is not open access. Although access in the communal areas is theoretically open to all Namibians, areas fall under the jurisdiction of the chiefs and they manage it and control settlement and grazing rights.

Himba families "own" the lands immediately around their household complex including huts, gardens, graveyards, and nearby pastures. The "owner" is ordinarily thought of as the senior male in the family, referred to as the guardian of the land.

Grazing rights are held communally and Himba communities share vast grazing lands, meaning each Himba community must respect the respective communal grazing rights of the other communities. Before land can be used permission should be sought from the guardian of the land. In this way the cattle of many families often graze together.

Grazing lands must be carefully used in order to save the most reliable grass for the driest months. Groups of senior men allocate grazing rights. No herd

may move ahead of another, nor are the combined herds allowed to move over new grass, trampling or spoiling it before it can be grazed. Some grazing land is held in reserve for drought periods. Since cattle have great value, these grazing rights are among the most valuable assets of a community. Land close to the Kunene River has some of the most reliable grazing and therefore most communities have grazing rights in this area. During the rainy season the cattle herders are prohibited from using the grazing areas in Epupa falls, to enable them to save it for dry seasons.

In addition to the above, the Himba use the area as the migration routes to get to strategically located pastures. The degree of movement is lower in Angola than Namibia, as most cattle are mostly kept in the vicinity of the homestead.

Himba households also carry out seasonal gardening on the bank of the Kunene River. There is no irrigation of land used for gardens and once a plot has been used the land is left fallow for a few years. The main crops are maize, millets, and pumpkins which are mainly used for household consumption.

## *6.5 EMPLOYMENT, LIVELIHOODS, NATURAL RESOURCE USE*

### *6.5.1 Employment*

The overwhelming majority of the Himba are employed in the agricultural sector (subsistence farming). Livestock rearing and rain fed farming are combined to some degree. Occasional salaried jobs occur, usually for the government or tourist industry. Small scale trade is also practised, with combined focus on household commodities, goats and alcohol. Cattle traders also visit the area, although the practice of selling cattle for cash is not common.

### *6.5.2 Agriculture*

*Angola*

**Kunene Province**: Most of the population of the Kunene Province are engaged in subsistence agriculture**.** The principal agricultural activity is rain fed cereal production combined with livestock rearing. Arable agriculture is constrained by poor soils (sandstone and lithosols) and by the limited and erratic rainfall. The primary crop grown is millet, augmented with sorghum. Some inter-cropping of pumpkins, beans and groundnuts also occurs. Millet is the staple food. Yields are generally low, averaging between 250 and 350 kilograms per hectare.

Data from the 1970s indicate that the average agricultural allotment then was 6.8ha, of which three hectares were planted. In 1990 it was estimated that there were 39,000 such farms.

During the colonial era and immediately thereafter, vegetables and fruit were produced commercially along the banks of the Kunene.

**Namibe Province:** The climate is predominantly semi-arid or arid, and so the province has relatively limited agricultural potential. The rainfall varies from 800mm in the Northeast to less than 30mm along the coast. Soils are generally poor and arable agriculture is limited to alluvial silts along the banks of seasonal and perennial rivers.

Some millet, sorghum and maize are grown in the province, while olives, grapes and citrus are grown in the vicinity of the provincial capital. All pre-existing commercial farms have ceased to operate and most production is for domestic consumption or for sale in informal markets.

*Namibia*

**Kunene Region:** Small-scale horticulture is practised in the wet season along the larger ephemeral rivers. The principal crops grown throughout are millet and sorghum, supplemented with some maize and pumpkins. Although this form of domestic production is limited, and yields are generally small, it does represent an important supplement to household diets. While communities in the north of the region typically have temporary gardens situated on river banks or near springs, more sedentary Herero communities in the centre and south of the region have larger, more permanent fields and gardens, a few of which are irrigated.

### *6.5.3 Cattle Farming and Pastoralism*

*Angola*

**Kunene Province**: The province was one of Angola's principal livestock production areas during colonial times. Since then the commercial cattle farming sector has collapsed. However, traditional livestock farming has continued to flourish despite decimation in recent droughts. In 1995, the provincial herd was estimated to consist of 600,000 head of cattle and 100,000 goats.

**Namibe Province**: The provincial herd is estimated to comprise 315,000 head of cattle distributed among 4,000 households - an average household ownership of between 70 and 80 head of cattle. Households also own small flocks of sheep and goats which are consumed domestically.

*Namibia*

**Kunene Region**: The primary contribution of cattle to the household economy in the Kunene Region is in the form of a milk staple, butter fat, meat, leather and horn. In addition, cattle represent the principal store of wealth in the area, and the slaughter of cattle among the Himba is largely limited to ceremonial occasions, and to meet pressing demands for cash. Goats and sheep provide

the major source of domestic meat and are slaughtered regularly. Goats' milk and goat and sheep skins are also utilised.

The sustainable livestock production in the semi-arid environment of the region has led to the evolution of an integrated system of transhumance and range management, in the entire Kunene Region as well as in the Project Area. This system, which is based on seasonal movement of stock, serves to optimise usage of both water and pasture within the prevailing ecology.

### *6.5.4 Livestock markets*

*Angola*

Due to the effects of the civil war, Angola's agriculture and infrastructure such as roads used to transport products were damaged – land that was used for agriculture remains largely unused due to the risk of landmines and livestock rearing is mainly undertaken as a subsistence activity.

However, the provinces of Kunene, Namibe and Benguela do have dairy herds; these are a marker of wealth and cattle are rarely sold.

There is no formal meat marketing system so the sale of livestock is therefore by private individuals. There is also a growing informal livestock market between Namibia and Angola where the price of livestock is determined in the US$ currency.

*Namibia*

Livestock marketing is done informally (bush slaughtering, roadside trading, auctions, etc) and formally through the parastatal Meat Corporation of Namibia (Meatco). Prices are set by the Meat Board, a statutory body, which computes a formula to determine a weekly producer price which is based on auction prices in South Africa. While the previous marketing system run by the former First National Development Corporation (FNDC) paid lower rates for cattle north of the Veterinary Cordon Fence (VCF), Meatco operates a uniform national live weight pricing and grading structure. This can in part account for increases in cattle sales between 1991 and 1992 when the new scheme was introduced. Auctions are held periodically at Okangwati, Opuwo, Ombombo, Otjondeka, Otjokavare, Otjitjikwa, Omakange and Omutambo-Omawe. Cattle are readily brought over from Angola for sale at public auctions and to private traders.

Official off-take of livestock in the Northern Communal Areas is currently very low at less than 2 percent. At the same time, informal off-take is estimated at about 5 percent. Off take rates in the commercial areas are much higher at about 25 percent. Although off-take of livestock in the northern communal areas increased from 16,244 in 2006 to 21 293 in 2007, it still means that only about 38 percent of the current capacity of the Meatco abattoirs in Oshakati and Katima Mulilo (ARD, 2008).

Sales from the region are relatively constant. Cattle are generally sold at an older age than in other regions, but the quality of beef is of a good standard. At present, sales from the western part of the region are limited due to poor road conditions which prevent access by trucks and also the long distance which farmers must drive their cattle to the market.

As goats are not subject to quarantine regulations, they are readily exported from the region. In addition to traders from the former Owambo region, who barter stock for alcohol and other goods, buyers are known to come from as far afield as South Africa to purchase goats.

### *6.5.5 Fishing*

*Angola*

**Namibe Province:** The offshore Benguela Current brings nutrient-rich cold waters that support a diverse number of commercially exploited fish, particularly hake, sardines, horse mackerel, tuna, shrimp, lobster and crab. Fishing on an industrial scale in Angolan waters is predominantly carried out by foreign fishing vessels but small-scale fishing is an important livelihood for many Angolans (1) especially from villages along the coast such as Tombua, and Baia dos Tigres, which used to be commercial fishing centres.

**Kunene Province:** The Kunene River is not utilised for commercial fishing in this province although subsistence fishing activities do take place in the province.

*Namibia*

**Kunene Region:** Due to the low population density and the fact that the Hereros and Ovahimbas inhabiting the area along the lower part on the Kunene do not commonly utilise fish for food, the fish stocks of the Kunene River are presently not exploited to any degree.

### *6.5.6 Mining*

*Angola*

Mines exist in both the Kunene and Namibe province for:

- copper;
- lead;
- zinc;
- mica; and
- Uranium.

(1) New Agriculturalist (2009)..

The mines are located near the Kunene River. Other minerals in the area include iron and copper in the Kunene province and marble and granite in Namibe Province. However, as with many other activities, mining of these products was disrupted by the civil war in Angola and not all mines have resumed operations.

*Namibia*

The northern Kunene has not been well explored and its full mineral potential is not yet known. Recent exploration in the area has failed to locate any major mineral resources but have revealed a number of deposits, (titanium, nickel, lead-zinc and copper), which might be viable for small-scale mining operations. Traces of rare metals, such as zirconium, have also been found. At present there are several small scale mining operations underway in the Region. These include two garnet mines in the Marienfluss area and a Blue Sodalite mine at Swartbooisdrift.

*Figure 6.2* shows all the Exclusive Prospecting Licence (EPLs) and mineral licences registered in the Kunene Region of northwest Namibia.

### *6.5.7 Commerce*

*Angola*

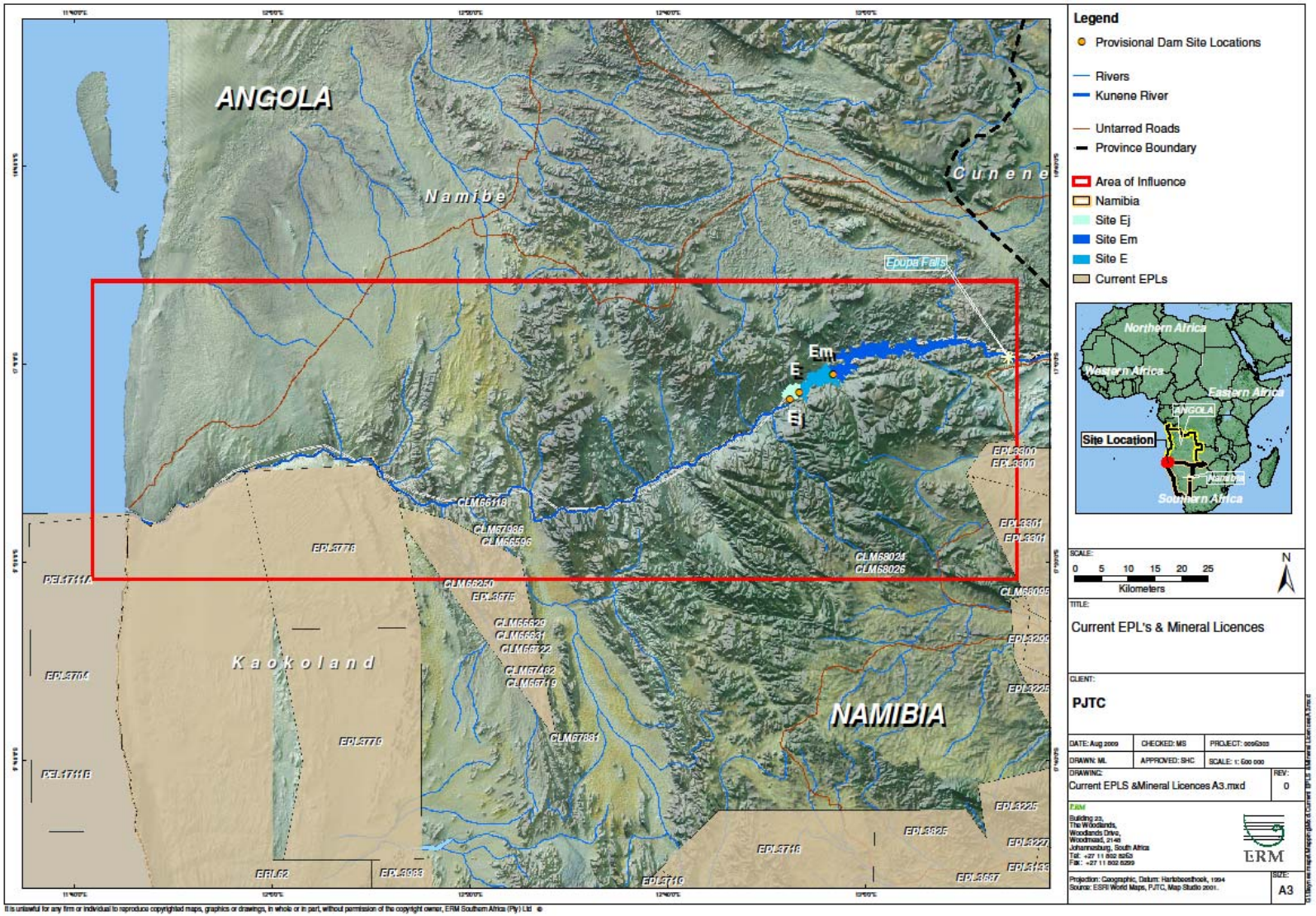
**Kunene Province**: Due to the effects of the past war in Angola, the commercial sector in the province is weak. In 1995 there were approximately 35 shops and 13 informal markets in the entire province. The majority of commercial goods sold are brought in from Namibia. The range of goods sold is limited and prices are high. Most households rely on the informal sector for the purchase of goods and services. No banking facilities exist however the opening of a branch of the Savings and Loan Bank (BPC) in Ondjiva, will facilitate some access to credit.

**Namibe Province**: The province's fish processing industry includes the production of fish meal, freezing, salting and half curing of fish. A variety of sea food including crabs, cockles and mussels are also harvested for local consumption and for export. Lack of management, the absence of a marketing infrastructure and a lack of investment, have led to a serious decline in the fish processing industry. With the privatisation of state owned enterprises, some regeneration of the sector might be expected.

The retail sector, although limited, is an important source of employment and income generation. The trade in commodity goods (food, clothing etc) is particularly lively in the informal sector on the urban peripheries. Formal enterprise, in contrast, suffers from a shortage of capital and the effects of hyper-inflation. During the period from August 1994 to August 1995 the inflation rate was 2,040 percent. There exists little commercial activity in the rural areas.

Branches of the National Bank of Angola (BPA) and the Savings and Loans Bank (BPC) operate in the major centres. Due to the national fiscal crisis, there is a general shortage of cash in circulation - a factor which impacts negatively on the development of commerce in the province.

*Figure 6.2* *Current EPLs and Mineral Licenses registered in the Kunene Region*



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*Namibia*

There is a small commercial sector in Northern Kunene, oriented to the retail trade. Opuwo has the only petrol service station in the region, as well as a variety of businesses including a bakery, vegetable suppliers, a video rental store, a wholesaler, a guest house, a lodge and number of general dealerships. There are banking facilities in the town.

Problems of communication, high transport costs, and the small size of the local market are reported to be constraints to the expansion of the commercial sector in this region. A number of the entrepreneurs in Opuwo and elsewhere are from outside the region (from the former Owambo region in particular). These entrepreneurs have the resources to establish businesses. In the smaller urban centres, commercial activity is confined to general dealerships and liquor outlets selling modern and traditional alcohol.

A small informal sector exists in Opuwo, trading in petty commodities and in liquor. There are also some small income generating enterprises including brick-making, shoe repairs, the making of wire fences, needlework etc.

## *6.6 EDUCATION*

*Angola*

**Kunene Province**: There has been little development of the educational sector in recent years. There are 325 primary schools, 14 secondary schools, 6 schools for higher education and one polytechnic institute. The educational infrastructure is generally poor. Many schools are in a reduced state of repair, having been built with local building materials and having undergone little maintenance. Schools lack books, equipment and furnishing. In addition, a lack of dormitories together with a shortage of staff accommodation limits the number of students who can attend boarding schools in order to further their education. This is particularly the case for students from the rural areas. As a consequence, many children never attend school at all or else attend at a very late stage.

In 1995 there were 33,688 pupils, 31,887 (94 percent) of whom were in primary school, 1,299 (4 percent) were in secondary school and just 502 (less than 2 percent) were in higher education. Today, just 25 percent of children of school going age are currently attending school. Official statistics indicate that there are only high schools in three of the six municipalities. While there are some 1,195 primary school teachers (providing a teacher/pupil ratio of 1:26), there are only 13 high school teachers in the entire province.

The educational standards are also poor in the province, while functional literacy, similarly, is likely to be low. Low educational standards and the

limited availability of vocational training are also likely to limit the skills base of the population.

**Namibe Province**: The education system in the province is weak. Schools are run down and ill equipped, teaching material is scarce and many pupils lack even basic texts. There are in all 57 schools in the province, and the majority of these (56 percent) are located in the provincial capital of Namibe. The municipalities of Virei and Camacuio each only have two schools while Tombua has five. Educational standards are low and 51 of the 57 schools cater for grade I pupils alone. There is a general shortage of teachers and pupil/teacher ratios are 53:1 on average, and as high as 75:1 in Namibe. Some 25,000 pupils are currently attending grades I, II, and III; this is equivalent to just 44 percent of those of potential school going age. No high schools exist in the province, although there are five professional training centres catering for the following disciplines: public health, accounting and typing, physical training, fishing and civil engineering. In addition, there are three geo-technical stations and a branch of the National Institute for Fisheries Research.

*Namibia*

**Kunene Region**: Educational services and standards in the region are low, facilities are limited or non-existent and teachers are poorly qualified and poorly motivated. There are a total of 34 schools in the region; of these 27 are primary schools, three are primary schools with grade 8, two are junior secondary schools and two are senior secondary schools. A number of these schools lack proper classrooms and equipment. For example, many schools lack boarding facilities despite the fact that most of their pupils live too far away to be day scholars. In these situations, pupils live in rudimentary, mixed sex dwellings.

School attendance is low; in the 1991 census 60 percent of children aged six to 16 years did not attend school. Himba elders interviewed complained that schooling made their children "useless" in that, having spent time in a classroom, they are unwilling to return to their traditional way of life, to cattle management and to domestic responsibilities. At the same time, the schooling which they receive does not qualify them for any formal employment. Nevertheless, during the past three years, the number of Himba children attending school has increased. However, this can probably be attributed to the school meals scheme which was initiated during the recent drought.

Over-aged pupils are a phenomenon in most schools; many students are in their twenties. The differences in age present difficulties for teachers, in that teaching materials are unsuitable for adults and, in addition, the older students tend to inhibit younger and more motivated learners. Alcohol consumption is reported to be a problem among older pupils, particularly in Opuwo. The average drop out rate among primary schools is 13 percent, while

the failure rate is 19 percent. (1) As a consequence of poor attendance, levels of literacy are low.

The qualification levels of local teachers also contribute directly to low educational standards. In the junior primary schools, only 20 percent of the teachers and 35 percent of the principals were qualified in 1995. At the same time, only 30 percent of the senior primary English teachers were qualified. (2)

## 6.7 *HEALTH*

No accurate health statistics were available, but health reports from all six municipalities cite malaria, diarrhoeal diseases, acute respiratory ailments and measles (in descending order of severity) as the principle causes of death, followed by malnutrition and measles. Data on infant mortality rates are unavailable, although the national average of 195:1,000 (which is high by international standards) is likely to be indicative of a general trend.

The five most prevalent causes of morbidity among individuals over the age of 5 are diarrhoea and vomiting, malaria, respiratory infection, hypertension and tuberculosis. With the exception of hypertension, the pattern among children under the age of 5 is the same. In general, the incidence of malnutrition in the region is low, suggesting adequate food security. In June 1995, 12 percent of children aged 12 to 23 months were moderately undernourished, while 1.6 percent was severely undernourished. Within the functional zone of the proposed dam, no children were reported to be severely malnourished in the first six months of 1995. Etanga clinic reported no incidents of under-nourishment, while Okongwati reported that just 6 percent of children to be moderately under-nourished. (3)

At a regional level the incidence of sexually transmitted diseases (mostly gonorrhoea) is high in the region, especially in the North and Northwest of Namibia, where multiple sex partners are common. At the Etanga, Etoto and Opuwo clinics, STDs comprised 13.9 percent, 11.2 percent and 6.2 percent respectively, of all cases seen during the first six months of 1995. (4) The incidence of HIV infection in the region is unknown although it is anticipated that it is a serious problem. Certain Himba cultural practices make them particularly vulnerable to HIV/AIDS infection, including the practice of polygamy. (5) Since 2001 the Opuwo branch of the Namibia Red Cross Society has been conducting a reproductive health project teaching the Himba about pre- and post-natal care, contraception, family planning and sexually transmitted diseases, including HIV/AIDS. HIV/AIDS in the community, however remains a daunting challenge; "a *disease that can kill you in a decade*

(1) Sullivan, 1995
(2) Sullivan, 1995
(3) MOHSS, 1995
(4) MOHSS, 1995
(5) International Federation of Red Cross and Red Crescent Societies

*does not concern the older men of our community*," quotes a Red Cross volunteer. The combination of widespread STDs, existing sexual practices and a general reluctance to practice safe sex, is likely to lead to a more rapid transmission of the disease. (1)

At a local level, a special survey relating to water and health issues was carried out with women heads of households. A majority of the women interviewed did not understand any relationship between water and illnesses. Eight of the 37 persons interviewed in Namibia gave suggestions however; mostly referring to colds, coughs, malaria and diarrhoea. A few comments were also made on water quality; much rain was associated with stomach ache etc.

The site specific survey raised five potential problems: Difficulties with long walking distances, with turbid water, with diarrhoea in children, with bilharzia and with queuing. (2)

The total number of responses to the site specific survey was 36. The figure shows that bilharzias was not seen as a problem at all, that turbid water caused considerable concern, that queuing at the dispensary was seen as a major drawback. Long walks simply reflect the nomadic life situation, a fact which many also commented on; "*of course, we always have to walk far, but that is part of our life*". The most problematic issue mentioned was diarrhoea in children.

There is little difficulty to access household water in the area. Out of the 37 interviewed, only one indicated any difficulty; problems with long transport distances. Fetching water is a woman's task in the Himba community. In all cases women were said to be the persons fetching water; only two out of the 37 households interviewed implied that children might also fetch water.

The survey also included asking for expected prospects for the future. Most of those interviewed could not express an opinion (76 percent), while only 14 percent looked at future development to include improved health care.

Due to isolation and social practices the local population is presently considered to be relatively free from HIV. According to the 2004 National HIV Sentinel Survey, the rate of infection of pregnant women at the Opuwo sentinel site was only 8.5percent which is the lowest of all sites covered by the survey. With an influx of an external labour force this is considered one of the key vulnerability issues which needs active countering through publicity and education. The same sentiments go for Hepatitis B (and C) and STD's.

Future malaria patterns are more difficult to predict. A natural immunity must exist. This is connected with current seasonal migration patterns, and

(1) Schaefer, 1995.
(2) The last issue was thought of to associate with long waiting periods at medical treatment facilities.

with a presence of infected mosquitoes. This "load" can become overwhelming with the occurrence of more stagnant water. The situation might be balanced through a large fish population, consuming large quantities of anopheles larvae. A more stationary population in combination with more stagnant water combine for a major malaria threat to the community.

Schistosomiasis is present in the overall area but not a big problem at present. Smoking and alcohol consumption are currently serious problems in the area.

### *6.7.2 Health Infrastructure*

*Angola*

**Kunene Province**: Health services in the provinces are generally in a poor condition. Health facilities are run down and poorly staffed, and medicines are frequently unavailable. There are two hospitals in the province, one in Chiulo with 200 beds and the other in Ondjiva with 120 beds. In addition, there are 5 health centres and 24 health stations of varied standards. There are no more than 10 doctors in the province (1 doctor per 35,000 people) and some 220 health orderlies. The existing health services rely heavily on humanitarian agencies (Médecins Sans Frontières, UNICEF, AICF) for support in the form of staff, equipment and medicines.

**Namibe Province**: The health service and health infrastructure have deteriorated during the last ten years. The province has a network of three hospitals, six health centres and 38 health stations. Buildings are in a state of disrepair, facilities are poor and there is a severe shortage of medicines. The distribution of health facilities in the province is skewed, and the major concentration of health services is to be found in the municipality of Namibe, including two hospitals, three health centres and 11 health stations. Of the 21 doctors in the province, 20 are also to be found in Namibe. In contrast, three of the municipalities, Bibala, Virei and Camacuio, with a total population of 78,000, have no doctors and just 16 health auxiliaries.

As with the general health service, primary health care services have deteriorated and immunisation and basic hygiene programmes do not exist.

*Namibia*

**Kunene Region**: Up until the advent of independence in 1991, health services in the region were underdeveloped. Since then, there has been a quantitative and qualitative improvement in service provision, although poor road conditions and the nomadic movements of segments of the population limit access to primary health care. There are nine clinics in the region, an increase from three in 1991, and one hospital in Opuwo with 70 beds. The hospital has three doctors and is reasonably well equipped with an outpatients department, a theatre, a laboratory and a pharmacy; it also has x-ray and

blood transfusion facilities. Clinics are run by nurses and receive periodic visits from the doctors. Serious cases are referred to Opuwo hospital.

Primary health care services in the region, in contrast, are weak in their outreach work. This may be ascribed to a range of factors including a shortage of nurses, a shortage of vehicles and inaccessibility of many parts of the region. As a consequence, communities in the north and northwest do not have easy access to medical services and must travel considerable distances to receive treatment. Due to the inaccessibility of many communities and their itinerant lifestyle, moreover, immunisation cover in the region is poor. In 1995 the regional coverage for BCG, DPT and measles for children of one year of age and under, was 59 percent, 36 percent and 27 percent, respectively. At the Onkongwati clinic the vaccine coverage was estimated to be 32 percent for Bacillus Calmette-Guérin (BCG) (1), 7 percent for (Diphtheria, Tetanus and Pertussis) DPT and 4 percent for measles.

Alcohol abuse is reported to be a growing problem in the Kunene Region, particularly amongst unemployed youth. In the rural areas it is also aggravated by the practice many traders have adopted of bartering liquor for cattle and goats from the Himba people.

The hospital at Opuwo has a social work division which provides services to families in the vicinity. A state administered old age pension system is available to community members over 60 years of age. However, due to the remoteness of many communities and to a lack of information about the system, many old people do not receive state pensions.

### *6.7.3 Infrastructure*

*Angola*

**Kunene Province:** A primary road transverses the province from north to south. A network of secondary and tertiary routes extends to the six municipalities. While the main road is currently being reconstructed, the condition of secondary and tertiary roads is poor and many impassable, particularly during the wet season.

Electricity supply to Kunene is limited, confined to several small power stations or privately owned generators. The two main urban centres of Xangongo and Ondjiva are supplied by three 520 KW stations and two 90 KWA stations respectively. Most other urban centres have little or no power.

The inhabitants of the province rely on a variety of water sources including the Kunene and Kakuvalar rivers and their tributaries, boreholes and small dams and wells. Few boreholes (an estimated 50 out of the 350 sunk during the colonial period) are still operating, and water shortages are a consistent

(1) A vaccine against tuberculosis.

feature of life for those living away from the primary rivers. A UNICEF sponsored programme is currently under way to provide more secure groundwater sources, but the provision of water to all communities will require a considerable level of investment.

As with roads, other communication facilities are also generally poor. There is no formal transport system in operation, and both goods and passengers are transported by private trucks. Most areas are inaccessible by telephone and there is only one radio station and one television reception antenna. The municipalities of Cahama, Ombadja and Cuanhama have access to television and radio. Only the capital Ondjiva receives regular air flights.

The civil conflict of the 1990's has meant that social services were disrupted. In many parts of the province access is severely restricted by poor road conditions and by the prevalence of land mines. In such circumstances, no social services are available to the local community.

**Namibe Province**: Although the province has some tourist potential in the form of the Iona National Park, the Namib Desert, the hot springs and other attractions, the necessary infrastructure is lacking. Hotel and lodge facilities are poor, while the absence of tour operators and poor roads restricts access to tourist attractions. However, the fact that tourism in the Iona National Park is currently given to a private company to administer might lead to improvements.

The road infrastructure, although not directly damaged by the war, has fallen into a state of disrepair. A highway, from Namibe to Lubango, transects the province from east to west. Tarred roads also connect Namibe to Tombua in the south and Lucira in the north. All have deteriorated and cause serious wear on vehicles. The road network in the remainder of the province is limited, and roads which are in poor condition are frequently impassable in wet weather. There is no formal road transport system in operation and the public must rely on private vehicles for travel and for the transportation of goods.

The Mocamedes Railway (CFM) links Namibe on the coast with Lubango and Matala in Huila province. The rail infrastructure is in a poor state of repair and the service between Namibe and Lubango runs erratically. Nevertheless, the existence of a functioning rail line will be of considerable importance in the economic regeneration of the province.

There is an airport in Namibe and an airfield in Bibala and Camucuio, neither of which is currently functional. Regular flights by the national carrier, Linhas Aéreas de Angola (TAAG), link Namibe with Luanda and the other provincial centres. There are two ports in the provincial capital, one catering for the commerce and the fishing industry, and the other for the export of minerals. Both ports are in need of rehabilitation.

The province draws electricity from the Chito Power station in Namibe and from the Matala hydro-power station in neighbouring Huila. In 1993, the province consumed less than 2 percent of the total electricity used by Angola. (1)

Despite the existence of surface and groundwater reserves, the province suffers from continuous water shortages. This is due to rapid population increases in the urban centres and the inadequacy of water delivery systems, which are in need of major repair and upgrading. Problems in the rural areas, where just 50 of an estimated 348 boreholes are still operating, are equally serious. A shortage of groundwater during recent droughts has led to extensive stock losses and has accelerated emigration from the rural areas. UNICEF, in conjunction with Hidrominas, is currently engaged in a programme to restore non-functioning boreholes.

*Namibia*

The Kunene Region is relatively underdeveloped. Infrastructure such as roads hardly exists. The main road through the province goes to Opuwo and then on to Ruacana and Sesfontain. In general roads in the province are of a poor quality and some are only passable using a 4x4. There is no railway in the region. Airports exist in the region including one at Opuwo and one at Ruacana – flights are internal only. Some of the lodges etc in the region also fly tourists to them using small planes.

According to the 2001 census in Namibia in Kunene Region, 73 percent of households had access to safe water, 66 percent of households had no toilet facility, 22 percent had electricity for lighting, and 81 percent had wood or charcoal for cooking. (2) However the rural area of the region means that most households do not have electricity or gas supplies. Landline communication in the area is poor but mobile phone connection is possible in the area, although limited.

(1) INE (1995)..
(2) National Planning Commission, 2001.

Chapter 7

# Public Participation Process

# 7 PUBLIC PARTICIPATION PROCESS

## 7.1 INTRODUCTION

This *Chapter* identifies the key Baynes Hydropower Project stakeholders consulted and summarises the consultation activities conducted as part of the Scoping phase. The focus of the *Chapter* is a presentation of the consultation findings by issue.

A Public Consultation and Disclosure Plan (PCDP) has been developed which provides detail on the public participation process (see *Annex A*). The PCDP is an iterative document and will document the full suite of consultation activities and findings associated with the entire ESHIA process.

## 7.2 OBJECTIVES OF CONSULTATION

Stakeholder consultation to support the ESHIA process specifically aims to achieve the following objectives:

- to provide information about the project and its potential impacts to those interested in or affected by the project, and solicit their opinion in this regard;
- to provide opportunities to stakeholders to discuss their opinions and concerns;
- to manage expectations and misconceptions regarding the project;
- to verify the significance of environmental, social and health impacts identified;
- to inform the process of developing appropriate mitigation measures; and
- to analyse gaps identified from the issues trail.

## 7.3 STAKEHOLDER IDENTIFICATION AND ASSESSMENT

### 7.3.1 *Process of Identification and Key Considerations*

The project stakeholder identification was based on a combination of literature reviews, and discussions with officials from several institutions within the Governments of Angola and Namibia. The main considerations in the stakeholder group selection process were:

- those involved in project preparation;
- those whose activities coincide or overlap with those proposed by the project (such as relevant ministries, environmental and health officials, etc);

- those who may be directly affected by the project (regional councils, local authorities, traditional authorities and the local population in the project area, tourism operators, conservancies); and
- others that may have a stake in the project (such as NGOs, media, private sector companies, government agencies, international donors).

### *7.3.2 Key Project Stakeholders*

Key stakeholders have been identified as the following groups:

- media;
- NGOs;
- private sector companies;
- other civil society organisations;
- specialised government agencies;
- international donors;
- parliamentary committees;
- political parties;
- research institutions;
- traditional authorities;
- local authorities;
- regional councils;
- conservancies;
- local business interests; and
- private individuals.

Full and effective engagement with stakeholders to enable these organisations to comment and provide input to the Project is – and will continue to be – a priority for the Baynes Hydropower Project. A preliminary stakeholder list comprising international, Angolan and Namibian stakeholder groups and individuals who were identified as interested and affected parties to be involved in the consultation process is presented in *Table 7.1* below. An e-mail group and a fax group were also compiled from the list to inform the stakeholders either via e-mail or fax of the project intent and public meetings. A Background Information Document (BID) (see *Annex B*) was prepared in English and translated into Portuguese and then distributed in and Angola and Namibia. The dates and venues for the public meetings were advertised in three local newspapers in Namibia and four local newspapers in Angola.

The Background Information Document and the advertisement were also distributed through electronic media to all institutions and individuals on the stakeholder list. The stakeholder list will be further refined and updated as required throughout Phase 2 and project implementation, to reflect new developments and interest from new and current stakeholders.

*Table 7.1 Provisional Key Stakeholders*

| Category | Stakeholder |
|---|---|
| **Media** | |
| Newspapers | Jornal de Angola |
| | Novo Jornal |
| | O Pais |
| | Seminario Angolense |
| | Die Republikein |
| | The Namibian |
| | Allgemeine Zeitung |
| | New Era |
| Television | TPA 1 |
| | TPA 2 |
| | TV Zimbo |
| | Namibian Broadcasting Corporation |
| Radio | Radio Nacional |
| | Luanda Antena Comercial |
| | Radio Ecclesia |
| | National Radio |
| | Radiowave |
| | Radio Kosmos |
| **Universities** | |
| | Universidade Agostino Neto |
| | Universidade Catolica |
| | Universidade Lusiada |
| | Polo Univesitario da Provincia de Namibe |
| | University of Namibia |
| **Environmental NGOs** | |
| | International Rivers Network |
| | Earthlife Africa |
| | International Society for Ecology and Culture (ISEC) |
| | World rainforest movement |
| | Save the Rhino Trust |
| | IRDNC |
| | Desert Research Foundation of Namibia (DRFN) |
| | Wildlife Society of Namibia |
| | SENSE / Greenpeace |
| | Scientific Society |
| | Rede Ambiental Maiombe |
| **Social Development NGOs** | |
| | Halo Trust (demining) |
| | Oxfam |
| | Development Workshop |
| | Save the Children UK |
| | Population Services International (PSI) |
| | Catholic Relief Services (CRS) |
| | Medecins Sans Fronteires |
| | HIV/AIDS Alliance (rede Esperança) |
| | IBIS |
| | Namibia Non Governmental Organisational Forum (NANGOF) |
| | Rössing Foundation |
| | Hospitality Association of Namibia |
| | Kunene Region Conservation Association |
| | Namibian Community Based Tourism Association (NACOBTA) |
| **Women's NGOs** | |
| | Rede Mulher |
| | Promaica |
| **Private Sector Companies** | |

| Category | Stakeholder |
|---|---|
| | Epupa Falls Lodge |
| | Kunene River Lodge |
| | Omarungu Camp Epupa |
| | Epupa Falls Camp site |
| **Other Civil Society Organisations** | |
| | PRESTIGIO – Youth Association of Angola |
| | ADRA |
| | Associacão Mãos Livres |
| | Promaica |
| | Associação Justiça, Paz e Democracia |
| | Centro MOSAIKO |
| | ACADIR |
| | Forum of Local NGOs (FONGA) |
| | Legal Assistance Centre |
| | Namibia Nature Foundation |
| | Red Cross Society |
| | National Society for Human Rights |
| **Specialised Government Agencies** | |
| | Fundo de Apoio Social-FAS (Angola) |
| | Roads Authority (Namibia) |
| | Tourism Board (Namibia) |
| | National Heritage Council (Namibia) |
| | Namibia Agricultural Union (Namibia) |
| | Roads Contractor Company (Namibia) |
| | Namibian Coast Conservation and management Project (NACOMA) (Namibia) |
| **International Donors** | |
| | United Nations Development Program (UNDP) |
| | United Nations Educational, Scientific and Cultural Organization (UNESCO) |
| | United Nations Environment Program (UNEP) |
| | United Nations Permanent Forum on Indigenous Issues (UNPFII) |
| | Norwegian Agency for Development Cooperation |
| | Department of International Development (DfID) |
| | USAID |
| | European Union |
| **Parliamentary Committees** | |
| | Permanent Joint Technical Commission (PJTC) |
| **Political Parties** | |
| | Democratic Turnhalle Alliance (DTA) |
| | South West African Peoples Organisation (SWAPO) |
| | Congress of Democrats |
| | Rally for Democracy and Progress (RDP) |
| **Research Institutions** | |
| | World Commission on Dams (WCD) |
| | International arm of the First Nations Development Institute |
| | Southern African Institute for Environmental Assessment |
| | Namibian Economic Planning and Research Unit (NEPRU) |
| | GOBABEB Research and Training Centre |
| | Kaoko-Epupa Development Foundation |
| **Traditional Authorities** | |
| | Vita Royal House |
| | Otjikaoko Traditional Authority |
| **Regional Councils and Local Authorities** | |
| | Kunene Regional Council |
| | Opuwo Town Council |
| | Epupa Constituency Office |
| | Opuwo Constituency Office |

## 7.4 SUMMARY OF CONSULTATION ACTIVITIES

The consultation activities involved seven meetings that were held in both Angola and Namibia on the central, regional and local levels. The aim of the meetings was to provide background information about the proposed project and to solicit input from the stakeholders about the rationale and potential impacts of the project.

A similar agenda was followed for all the meetings in Namibia. Meetings commenced with a presentation about the rationale and technical aspects of the proposed project by a representative of the project proponent. This was followed by presentations on the potential social and economic impacts and the potential environmental impacts as identified from the previous Epupa Feasibility. Time was then provided for questions to obtain clarity about the project and comment on the plan. Following the discussion session, a card-writing exercise was then used to allow participants to record their perceptions of the potential impacts and benefits that could potentially result from the project. The cards were then sorted and grouped into themes. A summary of the themes that emerged from the meeting ended each meeting. The meetings were video recorded and can be made available upon request.

Before the project team could commence with the public meetings, an initial meeting with the traditional leaders in the Kunene Region was requested. This meeting was held on 18 May 2009 at Opuwo and was attended by 95 Chiefs, advisors and councillors. The primary objectives of this meeting was to ensure that the traditional leaders were the first stakeholders to be informed about the project; to share the Public Consultation and Disclosure Plan (PCDP) with them; and to amend the provisions of the plan where necessary and confirm the plan as the guiding document for consultation on the project.

The public consultation and disclosure plan was supported by the attendants with a number of additions and amendments agreed to including the following:

- Mr Karipetua Uarije would be appointed as Liaison Officer for the duration of the ESHIA project;
- a budget would be made available to enable effective public participation in the Kunene Region. This budget includes the provision of food to participants during meetings as well as a transport allowance for attendees who have to travel from afar to attend. The rationale for this is that distances are far and costs are substantial to attend the meetings;
- ten Himba representatives would be sent to the Windhoek Public Meeting as observers so as not to be excluded from any consultation events;
- it would be desirable if the Himba from both Namibia and Angola can be consulted as a single group; and
- a grievance committee be established to deal with any problems in the consultation process and that this committee be made up of one representative from the Ministry of Mines and Energy, one from

NamPower, one from the Kunene Regional Council, three from the community, and one legal person. A grievance officer will also be appointed as the secretary to the Grievance Committee.

The consultation process in Namibia commenced with a central level meeting at Windhoek on the 2 June 2009. The Windhoek meeting was attended by 45 people from various fields of expertise, professionals, the media, officials, interested individuals and 5 Himba observers.

The regional level public meeting took place at Opuwo on 15 June 2009 with 153 people in attendance. There were too many cards to sort at the meeting itself and therefore the cards were collected, and grouped into categories back in the office.

The local level meeting occurred at Epupa, on the weekend of 26-27 June 2009, preceded by a site visit to Orakawe. The meeting was attended by 433 members notably, of the local populace, chiefs, representatives, councillors and government officials. Following the presentation, the meeting attendants were asked to organise themselves into groups and write down the negative and/or positive issues regarding the project on flipchart sheets. Each group was asked to appoint a recorder and a presenter. The next morning a representative of each group were given the opportunity to present the feelings of the group to the plenary session.

The consultation process in Angola started at the local level with a meeting in the city of Namibe on 17 April 2009. The meeting was used to create awareness with the Regional Governor and its staff as well as to provide them with a road map of the consultation process activities.

The regional level public meeting took place in Tombwa on 16 June 2009 with 57 people in attendance. The meeting was presided over by the Municipal Administrator and gathered members from municipal administration, civil society and traditional authorities. Project information was provided to the participants through visual aids. Participants were invited to ask questions in the plenary sessions and their concerns were recorded.

The meeting in the Project Area was held in Iona on 24 June 2009. The meeting was attended by 56 persons comprised of municipal administration, the communal administration, traditional leaders and members of civil society. The presentation was divided into two sessions. The first session used visual aids to present the project and highlight the potential social, health, economic and environmental impacts. The presenters used simplified terms so as to allow a greater understanding from the participants. The second session consisted of a debate where participants were invited to ask questions on the presentation.

The consultation process in Angola ended with a central level meeting in Luanda on 29 June 2009. The Luanda meeting was attended by 61 people from various fields of expertise, including NGOs, academics, professionals, the

media, governmental officials, interested individuals and the private sector. The presentation was shared between the local consultants and the PJTC.

A summary of the consultation activities is provided in *Table 7.2* while a record of the key issues that were raised in each meeting is provided in *Table 7.3*. Records of the various meetings are contained in *Annex B*.

***Table 7.2 Summary of Public Participation Process***

| Activity | Purpose | Date of Activity | Registered Attendance |
|---|---|---|---|
| Chief's Meeting at Opuwo (Namibia) | Public Consultation with Himba Chiefs to agree on the best way to facilitate broad participation. | 18 May 2009 | 95 |
| Windhoek Public Meeting (Namibia) | Central level public consultation with key stakeholders and interested parties. | 2 June 2009 | 45 |
| Opuwo Public Meeting (Namibia) | Regional level public consultation with members of municipal administration, civil society organisations and local populace. | 15 June 2009 | 153 |
| Tombwa Public Meeting (Angola) | Regional level public consultation with members of municipal administration, civil society organisations and local populace. | 16 June 2009 | 57 |
| Iona Public Meeting (Angola) | Local level consultation with population at large and traditional authorities in project affected areas. | 24 June 2009 | 56 |
| Epupa Public Meeting (Namibia) | Local level consultation with population at large and traditional authorities in project affected areas. | 26-27 June 2009 | 433 |
| Luanda Public Meeting (Angola) | Central level public consultation with key stakeholders and interested parties. | 29 June 2009 | 61 |

## *7.5 MAIN SCOPING CONSULTATION FINDINGS*

The main Scoping consultation findings are provided in *Table 7.3* below.

*Table 7.3 Scoping Findings*

| Issue | Stakeholder Concerns and Questions |
|---|---|
| **Windhoek meeting - 2 June 2009** | |
| Demand Management | • What about the inclusion of energy efficiency countrywide (solar water heating can save 80MW of peak time)?<br>• Is energy demand management considered? |
| Time and Cost | • With the construction costs ever increasing, we need to be mindful of further delays as Namibia needs both the water and electricity already. |
| Elite Capture | • At the end of construction, does it mean that a favourite few would be allowed to buy (obtain) lakeside properties? Any ideas to prevent this. |
| Local Concerns | • Loss of "sense of place" ie dam, roads, power lines and related industries will change the North West.<br>• Local concerns will be swallowed by national and SADC needs. |
| Pumping | • For Namibia to benefit from the water why is serious pumping not part of the feasibility study? |
| Dam Safety | • With the filling of the dam, the pressure of the weight of the water on the land. Is this considered, with possible shifts, earthquakes? |
| The Right Option | • How can one be sure that such large centralised generation solution is economically viable?<br>• How many MW can be generated for the same money if Namibia invests in Energy Efficiency and Decentralised Renewable Energy generation?<br>• With so much uranium available why not also compare a nuclear power station as an alternative?<br>• Rehabilitate Calueque. |
| Contract Workers | • Will workers and construction village go afterwards? |
| Secondary Impacts | • The opening of Kaoko (roads and power) may spark a new mining rush in the area, ravine and Cape Fria Project. |
| Ecology | • Impact of pulses on downstream ecology.<br>• Length of time for dam to fill up.<br>• Sensitive ecology of Kunene River mouth.<br>• Danger of introducing alien fish production that could ruin indigenous species. |
| Management and Monitoring | • Does monitoring and implementation capacity exist for Environmental and Social Management Plan?<br>• Many good ideas but who monitors and enforces?<br>• Climate impact costs: cement manufacture, transport, greenhouse gas emissions, up and downstream sediments and deforestation.<br>• Efforts to achieve trans-boundary conservation may be undermined. |
| **Opuwo meeting – 15 June 2009** | |
| Socio-Cultural | **Impacts:**<br>• Deterioration of customs, beliefs and language through outside influences and manners.<br>• Graves will have to be moved which is against Himba culture.<br>• 2,000-3,000 workers will be foreigners therefore no job creation in community.<br>• During construction of the dam and after completion of the project, too many people will be attracted to the area and overpopulation will result.<br>• Pastoral system will be lost. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| | • The leadership of the Himba people will be challenged.<br>• The dam creates fear amongst the people.<br>• Land claims – people will be moved from areas inhabited by forefathers for centuries, places they identify themselves with and where strong cultural ties exist.<br>• Himba will not benefit because they are livestock herders.<br><br>**Benefits:**<br>• Improved service provision – educational and medical facilities.<br>• Minority cannot develop Namibia, but majority can.<br>• Himba can learn to live with many other people. |
| Modern Services | • Improved service provision – educational and medical facilities.<br>• Communication will improve with construction of roads and telecommunication infrastructure. |
| Land and Ownership | **Impacts:**<br>• Pastoral land will be captured by foreigners.<br>• Conservancies will suffer if natural resource is damaged.<br>• Loss of control over land and resources.<br>• Loss of homesteads, gardens, grazing field and bee hives.<br>• Damage of natural beauty and sense of place.<br>• Emergency grazing fields for drought years will be affected.<br>• Doubts whether local Himba community will be compensated.<br>• No more settlement, urban living directly lead to cultural loss.<br>• Government will take away my rights as a human being.<br>• People will be displaced.<br><br>**Benefits:**<br>• Kunene is a big area; people are not confined to movement near dam site. |
| Health | I**mpacts**:<br>• More disease like HIV/Aids, cholera and malaria.<br>• Dam and road safety to people and free roaming livestock.<br><br>**Benefits:**<br>• Potential for more and better health facilities. |
| Social Pathologies | **Impacts:**<br>• Murder, crime and theft of livestock will increase.<br>• Begging.<br>• Alcohol and drug abuse.<br>• Prostitution and rape. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| Economic | **Impacts:**<br>• Require elite capture mitigating conditions.<br>• Destruction of natural resources.<br>• What about Ruacana electricity?<br>• More business opportunities will be created like shops.<br>• Do not want to buy water we are currently using.<br>• Steps must be taken to ensure that short-term growth can be sustained in Opuwo especially after construction phase.<br>• Damage to tourism and natural resource.<br>• Loss of land, pastures and indigenous foods and fruit trees.<br>• Don't want foreign trade.<br>• People will buy on credit which can result in a loss for our people.<br>• The price of cattle will decrease.<br>• Shanty towns will grow (Informal settlement proliferation).<br>• Small local shops will loose out to larger businesses.<br><br>**Benefits:**<br>• Bring more development sectors to people left behind– economic diversification.<br>• We need the water and electricity in the region.<br>• The power will help to stop national crisis of the economy.<br>• The dam will stimulate other developments in towns.<br>• Some employment opportunities will be created and the community will gain valuable experience.<br>• Development in our region is invited.<br>• Electricity is already too expensive.<br>• Dam can attract more tourists into the area and thereby stimulate local economic growth.<br>• Community empowerment. |
| New Water Environment | **Impacts:**<br>• The dam will negatively impact on the Kunene River. |
| Downstream Effects | **Impacts:**<br>• Short-term impacts during inundation ("first filling").<br>• Long-term impacts on river levels during operation. |
| Groundwater and Water Resources | **Impacts:**<br>• The dam might cause underground water to recharge more slowly. |
| Pollution | **Impacts:**<br>• There will be increased levels of sound pollution.<br>• Water pollution will result from machines (oil spillage from motorboats).<br>• Environmental pollution will result from waste products.<br>• Industry and related activities will pollute environmental. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| Aquatic Ecology | **Impacts:**<br>• The indigenous water species, like fish and crocodiles, will be lost to lots of water. |
| Terrestrial habitats | **Impacts:**<br>• Historical mountains will disappear, unique landscape will be degraded.<br>• Loss of vegetation.<br>• Too much water will stunt growth of trees, in particular, palm trees will be lost and take too long, if ever, too recover.<br>• Look at our Forest Department because trees are very important to community.<br>• Organisms that live in soil will die due to soil erosion.<br>• Fear of deforestation like seen in the Northeast.<br>• Deforestation and increasing desertification.<br><br>**Benefits:**<br>Dam will not cause harm to environment. |
| Wildlife | **Impacts:**<br>• Animal migration will be affected.<br>• Disturbance of wildlife. |
| Global | **Impacts:**<br>• Destruction of trees very worrying because it creates air that people breath – Global Warming. |
| **Tombwa meeting - 16 June 2009** | |
| Mechanisms to protect the population | • What are the mechanisms in place by Government to ensure that the local population and local interests will be protected?<br>• What the project intends to do to ensure that the local work force will be hired. |
| Visual Aid for non literate people | • The project should think about using visual aid for the community that may have difficulty in reading and/or understanding technical aspects of the project. |
| Production and capacity of project | • What is the prevision of the production of the dam- What will be the capacity for the dam? |
| Project partnership at the local level and involvement of local population | • The project should put together a local team to work with the project team so as to ensure that local language will be used.<br>• The project should do a study how to involve local population. |
| Project amount and division of budget with the Government of Namibe | • What is the total amount of the project?<br>• What will be the division of the budget with the government of Namibia? |
| Local population registration | • We heard that the Government of Namibia has already registered the number of people that live in the area of the project, when will this happen here?<br>• If yes, what will be the impact? |
| Project synergy | • How will the mobilization of the communities in the areas of the project be done so as to ensure their participation?<br>• The project should develop synergy with the University of Namibe through some type of partnership so as to work together on some issues. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| Project time line | • What is the time line of the project? |
| Project benefit in terms of infrastructures | • Will a highway go through Tombwa to get to the area of the project? |
| **Iona meeting - 24 June 2009** | |
| Namibian experience | • Will the Himbas in Angola meet with the Himbas in Namibia as one group? |
| Project information | • How much the project will cost? |
| Expectations of the project benefit to the population | • Will the project bring specific support to agriculture? Will the project improve conditions for livestock herding? Will the project bring concrete benefit in the main communities activities such as agriculture, livestock and trade? |
| Protection of local culture | • The Project should protect and maintain the local culture.<br>• The Project should be used to promote the culture of the Himba population. |
| Employment opportunities to youth | • The project should ensure employment and to youth in particular.<br>• The project should provide training to the youth and the unemployed in particular. |
| Basic services (health) | • The Project should improve the supply of basic services of quality and health(hospital) in general. |
| Access | • The Project should improve Access, roads and communication in general so as to bring development in the area. |
| Expectations to improve well-being and means of livelihoods | • The project should promote agriculture and improve the conditions for livestock herding. |
| Brigdes | • The project should build a bridge along the road from Namibe to Tombwa and within the Namibe province. |
| Scoping Use of Namibe Port | • Hope that the materials and equipments to the Project will be carried through the Namibe Port so as to create employment and increase trade activities for the province. |
| **Epupa meeting - 26-27 June 2009** | |
| Socio-Cultural | **Impacts:**<br>• There are +- 10 ancestral graves that will be lost at Orokawe.<br>• Cultural change will erode Himba tradition.<br>• 2000-3000 men from outside the Kunene will impregnate Himba women and community end up with children from fathers that cannot be identified and unmarried women.<br>• Unmarried, outside workers, will not contribute financially to poor households.<br>• Inundation of graves against Himba culture. |
| Modern Services | **Impacts:**<br>• Health facilities and schools will negatively affect our lives: Schools take children away from herding work and without herding work, schooling cannot be paid for.<br><br>**Benefits:**<br>• Without power no school, clinics, roads, ambulances etc. available.<br>• Creation of a police station at Orokawe. |
| Land and Ownership | **Impacts:**<br>• Homesteads will have to be removed and displacement of households.<br>• The dam will lead to dispossession and contribute to our loss of land. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| | • New areas where people are to be relocated are unknown to them.<br>• Loss of gardens, grazing, bee hives and fruit trees.<br>• Road construction fragment landscape and dam destroy crossing points.<br>• Road will damage natural beauty of place.<br>• We will loose our human dignity. |
| Health | **Impacts:**<br>• Occurrence of STDs and HIV/Aids, which is reportedly the lowest in years, will spread. |
| Social Pathologies | **Impacts:**<br>• More people will lead to increasing crime rates and theft.<br>• Orphans.<br>• Alcohol and drug abuse.<br>• Rape and prostitution. |
| Economic | **Impacts:**<br>• New roads are unnecessary, although a main road might be helpful.<br>• Might have to pay to cross border and therefore not beneficial to community.<br>• The dam will lead to underdevelopment of community.<br>• Poor likelihood of jobs to locals because they don't have skills.<br>• Damage to natural resource will be detrimental to tourism if mismanaged, thereby diminish attraction of area, which is one of our main resources.<br>• Creation of jobs will destroy traditional practices and lifestyle.<br>• A bridge construction between Angola and Namibia will be adverse on our community.<br><br>**Benefits:**<br>• Boost local and regional economic growth and lead to development.<br>• Less crime through employment.<br>• More employment creation and better opportunities.<br>• An official border post at Orokawe and construction of a bridge will open area.<br>• Improvement and upgrading of road infrastructure.<br>• Self sufficiency in electricity supply for the country.<br>• Increasing trade integration between Angola and Namibia.<br>• Increasing accessibility though road connection.<br>• Standard of living will improve.<br>• Rural electrification is possible.<br>• Create food security. |
| Groundwater and Water Resources | **Impacts:**<br>• The number of people that can draw water will be minimised.<br>• Relocation will cause concentration of people in some area that puts pressure on scarce water resources. |
| Pollution | **Impacts:**<br>• Water and earth pollution will negatively affect living conditions of all people and animals surrounding project site. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| Aquatic Ecology | **Impacts:**<br>• Water species may be affected (fish and crocodiles).<br>• Adverse effect on river ecology. |
| Terrestrial habitats | **Impacts:**<br>• Threatened plants will be destroyed.<br>• The trees will die. |
| Wildlife | **Impacts:**<br>• Loss of wildlife and species might die out. |
| **Luanda meeting - 29 June 2009** | |
| Access to information on the project | **Access to information**<br>• The information on the project needs to be improved.<br>• Site should have more information.<br>• Local contact should be added to the site. |
| Mechanisms to protect the population | **Human Resettlement**<br>• Make sure that the people who will be resettled will be relocated to appropriate places with good conditions and will not be affected by other future relocations. |
| Local development | **Employment**<br>• What the project intends to do to ensure that the local work force will be hired? |
| Expectations to improve well-being and means of livelihoods | **The Food Safety Office from the Ministry of Agriculture**<br>• Study was recently conducted in the area.<br>• Kunene has an extensive farming area that should not be affected by the project, particularly with regards to access to water. |
| Project information | • Who is going to pay for what?<br>**Positive impacts**<br>• Positive impacts should be highlighted?<br>**Alternative Sites**<br>• Did the EIS analyse the three alternatives? |
| Environment/ Biodiversity | **Water Quality**<br>• Consider the water quality of the dam during the construction phase, particularly during the filling of the dam.<br>**Ecological flow**<br>• Detailed studies on the water flow will need to be undertaken as the filling of the dam might take some years and it will affect the water flow of the river.<br>**Loss of sediments**<br>• The Baía dos Tigres will be affected by the dam as it will decrease and limit to amount of sediments carried down the river which might in turn result in the loss of this Bay.<br>**The Baía dos Tigres**<br>• The Baia dos Tigres is currently an island (the marine currents go from south to north).<br>• Is the project going to support the erosion or will it be able to maintain the flow of sediments so the Baía is protected.<br>• Studies done 10 years ago on the Kunene river mouth and Baía dos Tigres should be revisited.<br>**Protected Areas**<br>• The existence of the Iona National Park and the Skeleton Coast Park should be considered as well as the impacts on the |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| | biodiversity of these protected areas.<br>**Surroundings areas**<br>• The study also focuses on the surrounding areas such as the aerial transmission lines and other areas which will be impacted by the Baynes project.<br>**Environmental legislation**<br>• The EIS team should consider the Angolan decrees on environmental impact assessment (nº. 51/04) and environmental licensing (nº. 59/07). |
| Building of the dam | **Issues on the construction of the dam**<br>• The dam will not affect the course of the river as it will be deviated so as to enable it to carry water and solid matter.<br>• The filling of the dam will be planned.<br>• The construction and filling of the dam will result on erosion in the river banks.<br>**Seismic**<br>• The geology of the area will be seriously considered as the filling of the dam and construction work could cause pressure on the land and river banks resulting in significant geological changes.<br>• Studies on the seismicity should be undertaken. |
| Kunene River | • It was suggested that the study should also focus on the Kunene River mouth particularly with regards to its ecological, social and economic importance.<br>• Only recently the Kunene River goes to the ocean, it is a young river and its river banks are still being defined. The Kalahari deserts moves north and the Kunene river, if weak, will be insufficient to carry down the desert sand to the sea.<br>• The river mouth is very sensitive and is also used as resting point and source of sweet water by migratory birds from South Africa and Europe, thus it cannot be affected both in terms of flooding or to dry out.<br>• Kunene has an extensive farming area that should not be affected by the project, particularly with regards to access to water. |
| **Specialist Workshop, Windhoek – 2 July 2009** | |
| Socio-Cultural | **Impacts:**<br>• 2000-3000 workers: Outside influence contribute to cultural erosion and change in social structure.<br>• Change in social fabric through potential employment creation during construction:<br>o Household labour patterns; and<br>o Domestic lifestyles.<br>• Settlement development and informal settlement formation, related influences like Ruacana/Oshifo.<br>• Socio-cultural heterogeneity.<br>• Kunene will end up with children from fathers that cannot be identified.<br>• Influence on local institutional structures – strongly related to their ability to successfully farm in a harsh environment.<br>• Inundation of graves and cultural heritage – reportedly unacceptable in Himba culture.<br>• Cultural linkages and land claims – status related to being able to prove how long your family resided at the specific locality.<br>• Himba will not benefit because they are livestock herders.<br><br>**Positive responses:**<br>• Improved service provision – educational and medical facilties, government services, consumer goods etc. (conditional).<br>• Formal crossing point to Angola – bridge. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| Modern Services | **Impact or Benefit?**<br>• School, health facilities, shops etc. seen by some as negative because it cause the youth to question their own culture and adopt western ideas. Also cause children not to be able to herd livestock anymore.<br>• Erosion of Himba culture – influence on the youth.<br>• Initial shortages especially health services.<br>• Effect of improved accessibility on cultural erosion. |
| Land and Ownership | **Impacts:**<br>• Displacement of some households.<br>• Land take for infrastructure, construction material.<br>• Loss of control over land and resources.<br>• Loss of gardens, grazing and bee nests.<br>• Barrier effect.<br>• Damage to natural beauty and sense of place<br>• Land invasion - "Foreigners will take our land."<br>• Government will take away my rights as a human being.<br>• A bridge between Angola and Namibia will damage our community. |
| Health | **Impacts:**<br>• HIV/Aids, STD's and other communicable diseases will increase.<br>• Water-borne disease – Bilharzia, malaria and others more likely to occur.<br>• Dam and new roads is a risk to the safety of the local population. |
| Social Pathologies | **Impacts:**<br>• Crime.<br>• Begging.<br>• Alcohol and drug abuse.<br>• Prostitution / family break-up, rape are set to increase. |
| Economic | **Impacts:**<br>• Elite capture of benefits likely.<br>• Poor likelihoods of jobs to locals.<br>• Damage to tourism.<br>• Loss of productive assets – land, pastures, riparian resources with indigenous foods/fruits.<br>• Unsustainable use of natural resources such as firewood, building materials and waste generation.<br>• Rapid move to commoditisation of stock – breakdown of social security system.<br>• Consumerism will rise.<br>• Creation of jobs will destroy our society. |
| | **Benefits:**<br>• Stimulus to the local economy – conditional to the extent of elite capture.<br>• Ready market for meat in close proximity.<br>• Availability of some unskilled employment opportunities.<br>• Potential growth in retail growth opportunities – dependant on extent of elite capture. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| | • Opportunities for tourism and fishing.<br>• Improved livestock marketing conditions for the North-West.<br>• More tourists, increased viability of community based tourism.<br>• Improved accessibility.<br>• Potential tourist attraction – more water based opportunities.<br>• Rural electrification possible.<br>• National Benefit. |
| New Water Environment | **Impacts:**<br>• Permanent land-take.<br>• Impact on reservoir water quality.<br>• Sedimentation and erosion. |
| Downstream Effects | **Impacts:**<br>• Short-term impacts during inundation ("first filling").<br>• Long-term impacts on river levels during operation.<br>• Long-term impacts on downstream river morphology and water quality. |
| Groundwater and Water Resources | **Impacts:**<br>• Short-term effects on water supplies during construction.<br>• Long-term effects on the groundwater table.<br>• Long-term effects on community supplies. |
| Pollution | **Impacts:**<br>• Risks during construction.<br>• Long-term risks to water quality.<br>• Generation of waste products. |
| Aquatic Ecology | **Impacts:**<br>• Short term impacts during construction and inundation.<br>• Long term effects of seasonally fluctuating reservoir levels.<br>• Impacts downstream.<br>• Effects on fish:<br>o Changes in species composition and population density;<br>o Effects on migratory fish. |
| Terrestrial habitats | **Impacts:**<br>• Loss of vegetation.<br>• Effects of changes in the water table.<br>• Effects on wildlife, including birds.<br>• Deforestation and increasing desertification. |
| Wildlife | **Impacts:**<br>• Short-term effects of inundation on wildlife.<br>• Damage will take long too recover.<br>• Long-term effects on birds and wildlife. |

| Issue | Stakeholder Concerns and Questions |
|---|---|
| | • Temporary effects on wildlife during construction:<br>o Disturbance of wildlife;<br>o Effects of noise, traffic and other human activities; and<br>o Increased hunting pressure during construction and inundation.<br>• Secondary impacts from movement of people. |
| Other potential impacts | **Impacts:**<br>• Susceptibility to climate change.<br>• Trans-boundary watershed management.<br>**Benefits:**<br>• Carbon trading under the Clean Development Mechanism (CDM). |

Chapter 8

# Preliminary Impact Identification

# 8 PRELIMINARY IMPACT IDENTIFICATION

## 8.1 INTRODUCTION

This section provides a preliminary identification and evaluation of the environmental and social impacts of the Baynes Hydropower Project. It sets out the potential impacts on the environment in *Section 8.2*, followed by the potential social impacts in *Section 8.3*.

These impacts where appropriate could be evaluated in more depth during the subsequent impact assessment (Phase 2). Other impacts could continue to be identified throughout the ESHIA process.

## 8.2 POTENTIAL ENVIRONMENTAL IMPACTS

This section describes the potential impacts to the environment as a result of the dam's inundation area, as well as both upstream and downstream of the dam site. Potential environmental impacts are presented both for the construction and operations phases of the Baynes Hydropower Project.

### 8.2.1 Climate

The climate of the project area is classified as 'semi-arid', with relative humidity ranging from as low as 10 percent to 50 percent in June to 90 percent in the lower Kunene in December. The formation of a large reservoir may therefore create a micro-climate with year-round elevated humidity levels around the reservoir boundary that may affect local vegetation and alter the availability of breeding grounds for insect disease vectors. Potential health impacts arising from the latter are referred to in *Section 8.3.5*.

### 8.2.2 River Flow

*During Construction*

The flow in the Kunene River will be diverted around the main dam construction site via a diversion tunnel, resulting in only localised changes and disruption to existing drainage patterns for the duration of construction. This may have consequent impacts on riverine habitats and water users in the vicinity of the construction site, although these impacts may be very localised and taken within the context of the overall disturbance caused by the construction activities themselves, are unlikely to be significant. In addition, the downstream flow regime in the river could remain largely unchanged since the releases that are being proposed during construction do not provide any significant impoundment to the flow or create any significant storage that would affect the flood hydrograph.

*During Operation*

There could undoubtedly be significant pressure to fill the reservoir as quickly as possible after construction, and so it is likely that a significant flow volume in the river may be captured in the reservoir until filling is complete and turbine operation has commenced. Filling of the dam could possibly extend to two years. Unless there are adequate compensation flow releases downstream during this filling period (for all water users, including ecological) then this could have a severe impact on environmental conditions downstream of the dam, up to and including the Kunene River mouth. The impact analysis could therefore consider this issue and make recommendations for a suitable release regime based on international best practices.

During normal operation of the dam, and especially that the proposed hydropower plant may be most suitable for peaking generation (ie the Power Station may supply power only for the peaking period ie 07h00 to 10h00 and 18h00 to 20h00 and is therefore typically started and stopped twice a day during weekdays), the regulation of flows through the turbines could create a modified flow regime (including low flows, both large and small floods and flow variability) in the river downstream, which may have a major impact on aquatic and riverine habitats downstream (as discussed elsewhere in this report), affecting aspects such as bed sediments, fish and macroinvertebrates, water quality and riparian vegetation.

A significant aspect of this impact assessment could include an assessment of downstream environmental flows. The environmental flow assessment could provide information that could allow for an optimization of flows to minimize downstream environmental impact, once a particular option for the hydropower plant has been selected.

### *8.2.3 Groundwater Levels*

*During Construction*

Apart from a localised depression in the water table due to any dewatering that could be necessary to construct the dam foundations, there are unlikely to be any significant impacts on groundwater levels as a direct result of construction activities.

Due to the remoteness of the site and the lack of any significant aquifers away from the Kunene River, it is unlikely that there are any existing water supply wells or boreholes in the immediate vicinity of the construction sites which would be affected by the dewatering. The impacts of dewatering on the smaller alluvial aquifers of any tributaries to the Kunene River in the project area could be investigated during the detailed impact analysis, and suitable mitigation measures developed if necessary.

*During Operation*

The Baynes reservoir could raise the water table upstream of the dam to the extent that yields from existing boreholes (if applicable) around the reservoir are likely to significantly increase. Water logging (and possible soil salinisation) may also occur in some low-lying areas around the reservoir, particularly along the downstream reaches of some of the tributaries that drain into the newly formed lake. The geology of the area (specifically faults and fracture zones) surrounding the dam could influence the extent to which changes are experienced in the groundwater regime downstream and in the area of inundation of the dam.

### *8.2.4 Water Quality*

*During Construction*

The main water quality risks that occur from dam construction relate to the potential spillage of fuels, lubricants and chemicals at the construction site, and the inadequate treatment and disposal of waste and wastewater from worker compounds. These should all be mitigated by the effective implementation of industry-standard practices for safe environmental management and pollution control on construction sites.

*During Operation*

Water quality problems may occur in the reservoir and downstream river due to a range of factors. While the main use of the reservoir water is for hydropower generation, possible water quality impacts could affect aquatic habitats and may affect artisanal fishing and/or water supplies.

Potential problems are as follows:

- Insufficient clearance of vegetation at the reservoir site prior to inundation may lead to the widespread decomposition of organic matter on the reservoir bed, could result in the generation of methane and possible depletion of oxygen levels in the water such that fish kills may occur;
- Depending on the stratification patterns and the depth of the euphotic zone in the new impoundment (i.e. the depth of the water in a lake that is exposed to sufficient sunlight for photosynthesis to occur), temperature, dissolved oxygen, turbidity and nutrient concentrations may change drastically when compared to the previous flowing river environment. These changes could determine which species could adapt, which could die out and which may take on pest proportions in the impoundment.
- The timing of water releases downstream and the depth from which these releases are made, may affect the temperature, oxygen concentration, sediment loads and nutrient concentrations in the release water that could in turn, potentially impact on the river downstream and on what lives there.
- Finally, the rise in water table associated with the reservoir and its operation (see earlier) may lead to changes in groundwater chemistry -

and hence local borehole water quality - as chemicals are leached from newly submerged rock and soil formations.

The extent to which the above problems occur could depend on a number of factors, including in particular the hydraulic conditions within the reservoir and the degree to which circulation or thermal stratification takes place. To some extent water quality downstream of the impoundment can be mitigated by careful "mixing" of the water released from the epilimnion (upper oxygen rich, warmer, less dense water layer richer in algae) and the hypolimnion (lower, oxygen poor, colder, denser, nutrient –rich water layer). The incorporation of a suitable tower structure in the design of the dam to allow for simultaneous releases from different depths could be further investigated.

### *8.2.5 Sedimentation and Erosion*

*During Construction*

The construction activities could by their nature lead to significant soil disturbance at a number of locations, including the dam site, the power house, the aggregate borrow areas and the workers' camp. All of these areas could therefore be at increased risk of soil erosion and degradation (eg through compaction) and subsequent increased turbidity and sedimentation. These risks should all be mitigated by the effective implementation of industry-standard practices for soil conservation on construction sites.

*During Operation*

In the reaches immediately downstream of dams, sediment supply is usually reduced due to the trapping of sediment in the upstream reservoir. Hydropower plants may also alter sediment transport very far downstream through alteration of the hydrology (and therefore the energy to move sediments), and this can be further exacerbated by peak daily releases (associated with peaking power generation). This may have a significant impact on the river morphology downstream of the dam, whereby patterns of erosion, transport and deposition along the river downstream to the Kunene River mouth may gradually shift until a new status quo is established over time. This changing morphology could have a consequent impact on river water turbidity and flow velocities, and hence on riverine ecosystems.

### *8.2.6 Flora (terrestrial and aquatic)*

*During Construction*

Construction of the main dam wall and associated infrastructure could involve large equipment operations, material storage areas, and administrative space (ie construction camp and other), which could remove and/or disturb vegetation in affected areas. This may primarily affect riparian habitats and hill-slope vegetation. Construction of new and rehabilitation of existing construction access roads could remove and/or disturb riparian and other vegetation.

*During Operation and Inundation*

Inundation of the reservoir may result in the direct loss of vegetation, primarily riparian vegetation (including *Hyphaene* palms) as well as hill-slope vegetation (which include important grazing areas), and sparsely vegetated open woodland.

Once inundation of the reservoir is complete, new wetlands and riparian vegetative communities should establish along its shoreline (littoral zone). Operation of the reservoir, including peaking and ponding operations and water level draw-downs, could define the vegetation communities that establish in the new littoral zone of the reservoir. Should the reservoir alter the flooding regime of the river, alien vegetation (such as *nicotiana glauca*) may establish itself along within the riparian zone. Relatively stable water levels should result in a relatively homogenous aquatic vegetation and/or wetland community along the reservoir shoreline. Significant daily or weekly fluctuations in water levels could allow for a more diverse shoreline wetland community that thrives with periodic water level changes. The presence of the reservoir could alter the groundwater table in the area immediately surrounding the reservoir (the new riparian zone), which could also affect vegetation composition and density in the vicinity of the reservoir. The magnitude and direction of this effect may depend on soils and topography, as these factors could influence the capacity for new vegetation species and/or communities to colonise the area.

Operation of the dam could reduce or eliminate annual riparian flooding downstream of the dam, which could cause a loss of riparian vegetation. Annual flooding delivers critical nutrients, sediment, coarse debris, and other critical ecosystem components to riparian habitats. Also, riparian wetlands could become uplands due to the lack of flooding.

Reservoirs often experience eutrophication, which can increase primary producers (phytoplankton and zooplankton) and spur the growth of aquatic vegetation including nuisance or 'sudd' plants (although no nuisance aquatic plants are known to occur in the project area). Aquatic weed species can degrade aquatic ecosystems by growing and spreading rapidly, forming dense floating mats of vegetation that overwhelm native vegetation, restricting light to the underwater environment, and depleting oxygen levels in the water.

The breakdown of organic matter (ie woody vegetation) in the reservoir could result in emissions of greenhouse gasses, particularly carbon dioxide and methane. The amount of these gases that could be produced could depend on the amount of vegetation that is inundated by the reservoir, the total surface area of the reservoir, and the flux rate. Vegetation biomass could be considered for the inundation area as this is also important as the Project could apply for carbon credits under the Clean Development Mechanism (CDM).

### *8.2.7 Habitats (terrestrial and aquatic)*

*During Construction*

Effects on terrestrial habitats during construction relate to the loss or disturbance of riparian and other vegetation in the immediate vicinity of construction activities, as described in the previous section. The loss or disturbance of riparian vegetation could cause increased river bank erosion in the vicinity of the construction activities. Large equipment operations and equipment lay-down could remove and/or disturb vegetation, potentially facilitating erosion of disturbed soils and compacting soils, thus increasing runoff velocity and erosion of down-gradient habitats.

Effects on aquatic habitats during construction of the project relate to the diversion of surface flows, increased sedimentation and the direct loss and disturbance of in-stream aquatic habitats in the immediate vicinity of construction activities. These construction-related effects on aquatic habitats should be localised and smaller in magnitude compared to the operational effects of the project.

*During Inundation and Operation*

Impoundment of the river could replace existing hydrographically distinct riverine habitat units that are characterised by a range of flow velocities and depths with a relatively homogenous reservoir. This habitat conversion may alter the species assemblage in the reservoir by displacing aquatic fauna that require riverine (flowing) conditions with habitat generalists (ie species that are not restricted to specific conditions or a specific food species) and species that thrive in lacustrine (lake) conditions. Although the new lacustrine habitats in the reservoir could differ from existing riverine habitats, the reservoir could provide more aquatic habitat than the river and may support a larger total population of fish than the river does under current conditions.

Alterations of depth and flow regimes may alter the surface water temperature within and downstream of the affected reach. Increased water temperature can affect the suitability of aquatic habitats for fish and macroinvertebrates and potentially cause a shift in species composition to more generalist species that are tolerant of a wide range of temperature conditions.

Natural flow regimes are important factors in determining the morphological characteristics, and thus the habitat value, of natural river channels. Habitat-forming flows often correspond to high-volume flows during flood events. Operation of the dam (ie flow releases) could limit the magnitude or duration of downstream high flow events and this could retard the natural progression of aquatic habitat formation in the river and potentially result in changes in species composition, density, and diversity of aquatic fauna downstream of the dam.

Operation of the dam may also interrupt natural sediment transport mechanisms, especially for coarse gravel and cobble, and the availability of course substrate downstream of the dam could decline. The depletion of coarse substrate reduces fish spawning habitat and substrate for invertebrates (macro-invertebrates, molluscs, and crustaceans).

### *8.2.8 Fauna (terrestrial and aquatic)*

*During Construction*

The noise, dust and human activity from construction activities could affect disturbance-sensitive animals and potentially result in their temporary displacement from current habitats. The construction of new roads to enable access to construction areas may cause fragmentation of terrestrial habitats, also causing wildlife disturbance and displacement. Displaced fauna may be subject to increased hunting pressure. In addition, poachers could have easier access to the area via the newly constructed project-related roads.

*During Inundation and Operation*

Reservoir inundation may result in displacement or drowning of terrestrial fauna from flooded riparian forest and open woodland habitats. Mortality due to drowning is likely to be more prevalent in ground-dwelling animals and smaller animals with limited mobility. If inundation occurs during the dry season when reptiles are aestivating (which is a state of dormancy similar to hibernation), these individuals could face mass drowning.

Inundation could cause a change in habitat conditions from riverine to lacustrine, which may increase the abundance of zooplankton, and have a subsequent impact on both aquatic and terrestrial fauna. The number and diversity of riverine aquatic species (riverine fish and macroinvertebrates) may decrease and conversely, the abundance and diversity of lacustrine species (phytoplankton, zooplankton, lacustrine fish and macroinvertebrates) could increase. The presence of the reservoir may also cause a shift in the terrestrial wildlife species assemblage from riparian to lacustrine. For example, the reservoir could reduce habitats for wildlife species that require flowing water (some insectivorous birds and bats) but increase foraging habitat for wildlife that prefers still or slow-moving waters such as waterbirds. Also, the reservoir may increase the perimeter of the existing river shoreline, and may increase the littoral habitat for wildlife.

Inundation could submerge tree trunks and other vegetation which could significantly increase the habitat available for macroinvertebrates, molluscs, snails and mussels, and generate nutrient material into the food chain for fish.

The bird populations may be affected by loss of breeding and foraging habitat, primarily in the cliff/rocky outcrop habitats at the dam site and in the riparian habitats that could be inundated by the reservoir.

The presence of the dam may potentially reduce or eliminate downstream floods, potentially reducing riparian wetlands and the aquatic and terrestrial fauna that spawn, rear, and/or breed in these habitats. Migration patterns of fish and other aquatic species may be blocked by the dam, potentially causing disruption to spawning and foraging which could lead to a possible decrease in gene flow and genetic variation in the river.

### *8.2.9 Secondary Impacts*

There are a number of potential secondary impacts from the Project that need to be considered, as follows:

- Construction of the project could require relocation of Himba households within the footprint of the reservoir, as well as the requirement for alternative grazing areas. As these people relocate, they could move through, and relocate in, areas that would otherwise be unaffected by the project. This may cause degradation or loss of terrestrial habitats and loss of wildlife species that are intolerant of human disturbance.

- With increased access and the development of a dam, the Project has the potential to promote tourism in the area, which would require improvements to infrastructure necessary for tourism (eg transportation, utilities, accessible energy, etc.). Such infrastructure improvements could result in habitat loss, wildlife disturbance, and habitat fragmentation and extend the effects of the project over a larger geographic area.

- These infrastructure improvements may change the 'sense-of-place' of the area, which could detract from its present wilderness appeal favoured and sought after by tourists to the Region.

## 8.3 POTENTIAL SOCIAL IMPACTS

This section describes the potential impacts to the social and socio-economic environment as a result of the construction and operation of the dam. Potential social and socio-economic impacts are presented both for the construction and operations phases of the Baynes Hydropower Project.

### 8.3.1 Loss of Land and Natural Resources

*During Construction*

Communities may lose primarily grazing land (land close to the Kunene River has some of the most reliable and hence valuable grazing) due to the construction and presence of the following project components:

- *Construction camp and associated infrastructure*. The precise location of the construction camp and associated infrastructure and the amount of land required for this has not been confirmed. Initial investigations indicate this land is currently used for grazing of livestock.

- *Quarries and borrow pits for dam construction material.* This may result in the loss of productive land unless they are sited within the proposed area for inundation. It is currently unclear exactly where they could be situated.

Furthermore, the construction of the dam is likely to require large numbers of skilled, semi-skilled and unskilled workers, many of whom are likely to come from outside the project area due to a lack of locally skilled labour. The size and provenance of this workforce is not yet determined. However the presence of large numbers of workers in the area may result in an increased demand for firewood, bush meat, fish, charcoal, and other natural resources from the surrounding riparian forests, open woodlands and rivers.

*During Operation*

Once the dam construction is complete and the reservoir begins to fill, all land below the 580m contour (as a worst case scenario) upstream of the dam could be inundated. Impacts due to inundation may include:

- Complete submergence of homesteads and cattle posts;
- The submergence of lands that are used for common access to natural resources, including riparian forest products (such as *Hyphaene* palms) and primarily valuable grazing land.

Households and/or cattle posts that lose a significant proportion of their land could require resettlement (see *Box 8.1*). Where grazing land is submerged, alternative grazing could need to be found. The extent to which the proposed project could cause the Himba to lose control over their land and resources is unclear and needs to be understood against the background of the

couldingness to ensure that such control is retained. There are strong fears that their land may be invaded, that others may take their land and that government may take away their rights as human beings.

***Box 8.1 Resettlement***

Several homesteads/cattle posts could be completely inundated and could require resettlement. In addition to the loss of land and assets, which can be restored, many are likely to face loss of social identity, disruption to livelihood practices and social fabric; some of which can become long term or permanent impacts. In addition physical relocation of homesteads/cattle posts may result in the disruption of traditional social practices and change in land ownership patterns.

Impacts could also extend to the host communities (areas to where the resettled populations could be moved). These may include cultural changes, increased health risks and greater competition for resources (primarily grazing land) and economic opportunities.

A Resettlement Policy Framework could be developed as part of the ESHIA that identifies relevant legislation and measures to resettle, compensate and rehabilitate the affected populations.

### *8.3.2 Disruption to Social Networks and Cultural Change*

*During Construction and Operation*

Initial observations indicate that homesteads/cattle posts of the Himba people in the area have very tight knit social networks that are well organised by the chieftaincy system. The influx of large numbers of outsiders, who could owe little allegiance to local tradition (and who may have much more money than local people) may result in significant social tension and change.

While it is undeniable that some extent of social change and cultural erosion is already taking place in the Himba Culture through the growth of Opuwo and Okangwati and exposure to tourists and other cultures, it is likely that the influx of large numbers of outsider may exacerbate this.

No data or assessments exist that can be used to approximate the extent to which the construction and operation of a hydropower scheme at Baynes is likely to accelerate this change and/or cultural erosion. This gap needs to be filled to supply realistic information about the likely levels of influence as well as to design mitigation measures to limit these potential influences, especially during the construction phase of the dam.

Local fears related to this centres around the influence on children, the introduction of more socio-cultural heterogeneity into the area, intermarriage between local Himba and people from outside, and influence on the effective local/traditional institutional structures which has so far largely been responsible for enabling the Himba to survive and become fairly prosperous farmers with the limited resources available in the area. These fears stem from the perceived influence of improved accessibility to the area, the large number

of workers that could come into the area during construction, the possibility that many of them could stay behind after construction and compete for resources, the negative influence of modern services and educational institutions, the negative influence of employment creation on domestic lifestyles and the division of labour, and the perceived negative effects of a bridge or improved access into Angola.

### *8.3.3 Loss of Cultural Heritage*

*During Construction*

The Himba people place considerable importance on ancestral gravesites through which they express their relationship to the land. The gravesites act as a focal point for defining identity, social relationships and relationships with the land, as well as being a focal point in religious ceremonies. This together with other cultural heritage aspects could need to be considered in detail and mitigation measures negotiated with directly affected communities or households.

### *8.3.4 Pressure on Social Infrastructure*

*During Construction*

The Project Area suffers from inadequate schooling and health facilities for the local population, and a shortage of potable water and transport facilities, including road networks. The influx of large numbers of people could place a greater strain on these already limited facilities and infrastructure.

### *8.3.5 Impacts on Community Health*

*During Construction*

Key communicable and other diseases that may be affected by the presence of the project during construction are:

- Acute respiratory infections and tuberculosis (TB);
- HIV/AIDS, Hepatitis B and C, and other sexually transmitted infections; and
- Malaria.

There is a risk that the workforce employed during the construction period of the dam could impact the local communities' health status. Groups vulnerable to health impacts would include young children, the elderly, the socio-economically deprived, and groups with chronic health conditions. The origin, size and health status of the workforce (a large percentage of which could be recruited outside of Angola and Namibia), and their cultural norms, could influence the nature and severity of these risks. For example, case studies of large construction projects elsewhere in the world have shown that the presence of a large number of single males in the construction workforce has

increased demand for casual sex. Measures to manage the interaction between the local community and the workforce could need to be developed and implemented.

Flooded or open trenches during construction may create additional mosquito breeding grounds, in particular during the rainy season; hence the prevalence of malaria may increase. In addition, noise and dust pollution from the construction activities, as well as the heavy construction traffic, may affect the communities residing close to the construction areas and main haul roads.

A significant increase in traffic levels combined with a number of factors including poor current road conditions, uneven surfaces and the limited understanding of road safety among local drivers and pedestrians is likely to increase the number of accidents.

The construction of the dam may lead to a rapid encroachment and influx of "exotic" in-migrant populations, which could overwhelm the indigenous populations. There are risks that high in-migration may bring about the dilution, alteration and erosion of indigenous cultures and significant weakening of local cultural systems among the riparian populations. The combination of rapid influx of people to a dam site and weakening of traditional structures can lead to changes in lifestyles, behavioural changes and loss of personal dignity, which could promote prostitution and crime. This can quickly lead to increased prevalence of sexually transmitted infections (STIs) such as syphilis, gonorrhoea and HIV/AIDS.

*During Operation*

In some respects, dam projects can improve the well-being of populations around the dam area (eg safe water more readily available, new infrastructure, better access to health care), and potentially increase the food supply (as a result of improved transport infrastructure, increased fish catches from a reservoir fishery). However, there are risks that health and nutrition may worsen, particularly in young children. Communicable diseases directly related to the presence of large quantities of standing water include:

- Malaria, which increases in incidence immediately after the building of the dam, after which a new balance develops between the human population and the parasites;
- Schistosomiasis, the disease which increases most in response to the building of dams, particularly in its most severe gastrointestinal form;
- Diarrhoea, as water is a major means of dissemination for many organisms, including those causing digestive tract infections;
- Gastroenteritis (amebiasis, salmonellosis, cholera), due to poor sanitation; and
- Other parasitic infections such as onchocerciasis and trypanosomiasis.

Other communicable diseases may appear or increase in incidence owing to the influx of migrants to the area. Sexually-transmitted infections and HIV/AIDS are a particular problem.

An increase in the numbers of insects particularly mosquitoes and blackfly may also have harmful effects on populations adapting to the new environment. There are also likely to be socio-demographic changes associated with changes in reproductive behaviour and women's activities. The location and nature of new homes and infrastructure (eg schools, health centres and roads) also contribute to the success or failure of dam projects.

### *8.3.6 Impact on the Local Economy*

*During Construction*

Many people consulted during the public participation process have high expectations with regards the benefits that they expect could accrue from the presence of large numbers of waged workers to whom they could sell goods and services. The potential impacts are summarised below.

- *Employment during construction:* The construction of the dam could take place over several years, requiring a potentially large workforce. It is not clear at this stage what skill types could be required, nor the extent to which employment opportunities could be created in the project area. The benefits to the local community from jobs could be dependent on the extent of local recruitment.

- *Increase in the local prices:* There could probably be a significant, though short-term improvement in the local economy (for example due to local procurement of supplies and services by the camp). However, there could also be an increase in the price of local goods, which could make life more difficult for those vulnerable sectors of society that are unlikely to benefit from the construction phase and are already finding it difficult to get by.

- *Elite Capture*: The likelihood of elite capture of potential benefits from the dam by external more knowledgeable and more powerful parties.

### *8.3.7 Impacts on Fishing (Upstream and Downstream)*

*During Operation*

From the experience of other dams around the world, it is probable that the existence of a permanent lake upstream of the dam wall would create a reservoir fishery that is more productive than the current riverine fishery. In the case of many man-made lakes, high fish yields were recorded during the first few years after dam construction but dropped as the reservoir matured.

The change in the flow regime of the river downstream could result in a decline in fish resources. The impact of declining fish stocks on food security

in the area is however unlikely to be significant, given that the directly affected communities downstream of the proposed dam do not commonly utilise fish as a main source of food.

### *8.3.8 Disturbance due to Dust, Noise and Safety Hazards from Traffic*

*During Construction*

The construction of the dam could require large quantities of building material and other supplies (fuel, supplies to the construction village etc.), some of which could be delivered to the site by trucks that are most likely to pass in close proximity to homesteads (although the exact access routes to site are yet to be defined). The road to the site is unpaved and the traffic through these homesteads could result in significant disruption from dust and noise from passing traffic. These homesteads very small and due to the rural nature, have experienced little traffic so far, increasing their susceptibility to disturbance. Safety could also be an important issue for residents who are unused to much traffic.

## *8.4 SAFETY OF DAMS*

The Baynes Hydropower Project may have implications for safety, during both construction and operation. The ESHIA study could assess the dam feasibility reports and previous studies, and could consider the appropriate use of design parameters related to:

- Flood handling and control, based on Probable Maximum Flood (PMF) calculations;
- Earthquake loading; and
- Design of components and appurtenant structures including spillways, outlets, and cofferdams required during construction.

### *8.4.1 Dam Design*

The technical investigation reports could be reviewed. Appropriate parameters for reservoir draw-down rates, downstream compensation flow requirements, reservoir operating rule curves and flood operations could be developed in concept.

### *8.4.2 Dam Safety*

Appropriate dam safety measures could be suggested to ensure that the dam design and long-term operation and maintenance programs are in place. The requirements for Emergency Preparedness Plans (EPP) for both the construction phase and the final dam could be developed in concept.

### *8.4.3 Dam Operation and Management*

Conceptual requirements could be developed for an Environmental and Social Operations, Maintenance and Surveillance Manual (OM&S) for the dam to encompass all aspects of long-term environmental and social operation and management of the dam and appurtenant structures. Suggestions for staff training requirements could be presented.

Chapter 9

# Terms of Reference for Specialist Studies

From the public consultation and review of secondary data, the preliminary identification and evaluation of impacts was undertaken in *Chapter 8*. In order to now assess in more detail the environmental and social impacts associated with the construction and operation of the Baynes Hydropower Project, certain specialist studies and processes have been identified, which include the following:

- Physical Environment and Resources, including:
  - Environmental Flow Assessment;
  - Kunene River Mouth Hydrodynamics Study; and
  - Groundwater Quality.

- Biodiversity and natural resources, including:
  - Terrestrial Flora;
  - Terrestrial Fauna and Avifauna;
  - Limnology and River Ecology; and
  - Fish and Fisheries.

- Social, socio-economic and cultural resources, including:
  - Social Impact Assessment;
  - Health Impact Assessment; and
  - Cultural Heritage and Archaeology; and

- Public Participation

To assess the potential aquatic ecological impacts that may occur as a result of the Baynes Hydropower Project, an in depth understanding of the physical functioning of the Kunene River system and the associated changes first needs to be understood. The Environmental Flow Assessment will assess the changes in hydrological and hydraulic functioning of the river, together with the potential geomorphological changes as a result of the Baynes Hydropower Project. A more detailed study specifically focussed on the potential physical changes to the Kunene River mouth will be undertaken separately and will use as input some of the data and outputs of the Environmental Flow Assessment.

Specialist from these teams will then work closely with the aquatic and terrestrial ecological teams to assess the potential impact on both the aquatic and terrestrial ecological systems. This in turn will be used by the socio-economic team to assess the possible socio-economic impacts of the directly affected communities who rely on the ecological systems for their livelihood. Public participation will be on-going throughout the ESHIA.

Although separate to the ESHIA process, an application for Carbon Credits under the Clean Development Mechanism (CDM) will also be carried out in

parallel to the ESHIA. This will be a stand alone study and its findings will be used to determine the options, costs and timelines required to commercialise the potential carbon credits should the Project prove to be eligible and feasible under the CDM.

## *9.1 PHYSICAL ENVIRONMENT AND RESOURCES*

### *9.1.1 Environmental Flow Assessment*

Environmental flows (EFs) are an essential element of the decision-making, policy and management tool kit for sustainable use of river systems, such as the Kunene River. Environmental flow assessments can bring into relief the implications of water-resource developments, or management strategies, on downstream ecosystems and communities. They also provide information that allows for an optimisation of flows to minimise downstream environmental impact once a particular option has been selected.

The Downstream Response to Imposed Flow Transformations (DRIFT) Assessment process will be used in the Environmental Flow Assessment for this study. DRIFT is a structured process for combining data and knowledge from biophysical disciplines to produce flow-related scenarios for water managers to consider.

DRIFT's basic philosophy is that all major abiotic and biotic components constitute the ecosystem to be managed and within that, the full spectrum of flows and their temporal and spatial variability constitute the flows to be managed. The EFR study will employ experienced scientists from a range of biophysical disciplines, namely hydraulics, fluvial geomorphology, river ecology (riparian vegetation and macroinvertebrates), and fish, who will all provide input into the DRIFT model in order to describe the river ecosystem and develop predictive capacity on how the river ecology would change with flow changes.

The outcome of the EFR study will include the identification of possible mitigation measures that could be implemented through operating rules for the Baynes Hydropower Plant. These mitigation measures will be finalised in consultation with the Techno-Economic team.

### *9.1.2 Kunene River Mouth Hydrodynamics Study*

The Kunene River mouth is a fluvially-dominated system and the limited seawater intrusion prevents the development of a typical estuarine environment. The objective of this study is to establish the effect of the managed flows, resulting from hydroelectric power generation, on the function of the Kunene River mouth, ie from the cascades immediately upstream of Foz do Cunene to the sea. Possible effects to be considered include greater seawater intrusion, reduced scour of sediments (both fluvial and aeolian) and mouth closure.

A volumetric approach will be used to estimate the potential impact of flow modification on the salinity distribution in the Kunene River mouth. Predicted changes in the hydrodynamic conditions in turn will be evaluated by the estuarine ecologists on the team to provide an assessment of the potential shifts in the ecosystem composition and productivity as a result of modifications to flows upstream.

### *9.1.3 Groundwater Quality*

Construction of the dam may raise the water table in the area surrounding the inundation zone, with an impact on local groundwater resources and their use. The extent of this effect is difficult to predict, since it will depend on detailed hydrogeological conditions in the reservoir zone. However, making some broad assumptions about the homogeneity and permeability of aquifers in the area allows a very approximate area of influence to be determined.

Changes to the downstream river flow regime may also influence water table conditions adjacent to the river channel. Therefore the reduction in variability in flow patterns downstream of the dam (an increase in low flows and a decrease in flood flows) is likely to give rise to similar change in the water table immediately adjacent to the river channel. As a consequence of these changes, land surrounding the reservoir and the river could experience either beneficial improvements or adverse effects on land quality and use and ecology.

An analysis of the current hydrogeological conditions in the catchment upstream of the dam site (to the Epupa falls) and downstream of the dam site will be conducted. This study will provide:

- A basic description of the hydrogeology of the area of interest based on hydrogeological maps of the area of interest;
- Current groundwater usage and yields in the area of interest, including uses for irrigation, drinking water, livestock watering etc. where applicable;
- A collation and summary of any groundwater quality data that exists in the project area; and
- A description of any potential impacts of the impoundment on groundwater levels and groundwater quality within the area of interest.

## *9.2 BIODIVERSITY AND NATURAL RESOURCES*

### *9.2.1 Terrestrial Flora*

The terrestrial flora study will consider impacts (both positive and negative) of the proposed project on plants, habitats and ecosystems, and provide guidance on the prevention of, and mitigation of impacts.

The terrestrial flora study will draw from existing secondary data in order to produce a vegetation community map. The vegetation community map will then be verified during field surveys and used to determine field sites for the analysis of vegetation types and in the estimate of biomass loss in the area of inundation.

The extent and composition of vegetation types will be verified using Braun-Blanquet type surveys, on plots standardised to 20 x 50 m. The riparian vegetation downstream of the dam at accessible sites will also to be sampled in order to determine potential impacts of altered flow regimes. The data will be analysed using multivariate techniques both for classification and ordination. (1) Once classified, the above data collected in the field will enable the preparation of an updated vegetation map.

From the survey data and additional observations and collections from the area, a species list will be compiled, with an estimate of the relative abundances of the species. In this way, the potential impact on especially rare and endangered species, endemics and near-endemics, as well as protected species can be highlighted. Rescue missions for such specific species can then be incorporated into the recommended mitigation measures in the ESMP.

Using the vegetation map and other additional data collected a vegetation sensitivity map of the Project Area and its surrounds will be compiled. This will be used to inform the Construction Management Plan (to be prepared as part of the ESMP) as well as the layout of infrastructure.

Within each identified vegetation type, the density of woody species, as well as the standing biomass of grasses, will be determined. With this data, linked to the vegetation map, an estimate of the loss of carbon sink and the potential source of methane through rotting biomass will be estimated. The estimate of biomass will also be used as input into the CDM study.

### *9.2.2 Terrestrial Fauna and Avifauna*

The lower Kunene River is unique in southern Africa, being a perennial river flowing through a hyper-arid wilderness. The river provides a linear oasis for many species of terrestrial fauna and avifauna and is home to a number of endemic aquatic and avifaunal species. In addition the proposed dam sites are in close proximity to the unique Baynes and Otjihipa Mountains, which although not extensively surveyed, are know to have a number of biotic species from further north in Africa that only occur here and nowhere else in the sub-region.

Although sampling and surveys were undertaken in the previous study, efforts were concentrated around the Epupa site and very little work was undertaken at the Baynes site. For all animal groups (avifauna, mammals,

(1) Ordination and classification (or clustering) are the two main classes of multivariate methods that community ecologists employ. Ordination is the collective term for multivariate techniques that arrange sites along axes on the basis of data on species composition.

amphibians and reptiles and invertebrates), more field work is therefore required at the Baynes site and downstream of it.

The preliminary inventory of the major habitats identified by the terrestrial flora study will be used by the fauna specialists during their collection and description of faunal assemblages. The terrestrial fauna and avifauna study will provide an updated list of species known and likely to occur in the focal area with respect to their global, national and local status. Endemic, migrating and Red Data species occurring in the area will be identified and the impact of the proposed development on their local and global status assessed. The possible changes to the faunal diversity and abundance and the possible conservation and operational impacts of the proposed dam and its associated infrastructure on fauna will also be assessed. Whether the proposed development is likely to pose any significant threat to any species will also be assessed.

### *9.2.3 Limnology and River Ecology*

'Limnology' refers to the physics and chemistry of the aquatic ecosystems, within the proposed impoundment, the river itself and the groundwater-fed pools (spring-fed seeps) in its tributaries, whilst 'River ecology' focuses on the aquatic and semi-aquatic plants and macroinvertebrates found there.

The main impacts on the limnology and river ecology of the Kunene River will be the creation of the impoundment and the impacts of water released from the dam on the biota downstream The objectives of this specialist study on limnology and river ecology are therefore to provide the baseline conditions of, and potential impacts on, the limnology, general ecology, aquatic and semi-aquatic plants and invertebrates of the Kunene River, focussing on the lower Kunene River, from the proposed dam at the Baynes site to Foz do Cunene.

The potential for eutrophication in the proposed Baynes impoundment will be assessed by applying the BATHTUB model to make reservoir-wide predictions of total phosphorus, total nitrogen, chlorophyll a, and transparency using nutrient load estimates. To estimate in-reservoir and tail-water temperature effects, either the longitudinal-lateral CE-QUAL-W2 model or the 3-D model GEMSS will be applied, depending on the shape of the reservoir (long and narrow in the first case, bowel-shaped in the second case). Both these models are time-varying and compute detailed flow fields, water surface elevations, and temperature. A single year of hydrology, meteorology, and hydropower operations will be simulated. Vertical temperature profiles and downstream temperatures will be computed by the model.

As for the EFR study, this data will be utilised by the river ecologists (aquatic vegetation, macroinvertebrates and fish) to assess the impacts of water temperature and water quality changes to the downstream river ecosystem.

### *9.2.4 Fish and Fisheries*

The major objective of the fish study will be to collect sufficient information on the ecology and distribution of the fish fauna of the lower Kunene River. The baseline study will then feed into the impact assessment and the development of appropriate levels of mitigation.

The study will initially carry out a desk based review identifying potential information gaps. Field work will then be undertaken to fill relevant gaps, focussing on the distribution and abundance of ecologically important fish species, endemic or rare fish fauna inhabiting the section from Baynes to Epupa Falls (impoundment); and the distributions of fish downstream of the proposed dam. The fish study will be linked with other studies of river fauna and limnology, particularly the aquatic vegetation and Environmental Flow Assessment studies.

The impacts of the proposed Baynes Hydropower plant on fish and fisheries in the lower Kunene River, both in the impoundment and downstream throughout construction and development will be assessed. Mitigatory measures and management plans for the construction, filling and operational phases of the Baynes Hydropower plant will be provided along with recommendations for appropriate levels of monitoring.

## *9.3 SOCIAL, SOCIOECONOMIC, HEALTH AND CULTURAL*

### *9.3.1 Social Impact Assessment*

The objectives of the Social Impact Assessment can be summarised as follows:

- To map in an understandable manner, the social geography of the study area inclusive of permanent and seasonal homesteads, population distribution, sites of archaeological and spiritual importance and the jurisdictional areas of the traditional leaders at various levels;
- To identify and physically demarcate the inundation area of the dam as well as other infrastructure so that it could be physically shown to the directly affected communities;
- To compile a population and demographic profile inclusive of levels of unemployment, education and skill levels, and health and education levels of the affected population;
- To understand land use patterns in the area inclusive of pastoral production, resource use and marketing;
- To understand the sources of livelihood and the distribution and use of resources;
- To map and assess current and potential economic activity in the study area inclusive of grazing areas, tourism, mining, agriculture and any other activities which contributes or may contribute to the economy of the study area and to determine the levels of access of local people to these;

- To improve the understanding of the local culture and belief systems and assess the impact of the proposed project on Himba culture.
- To identify and describe all sites of archaeological and/or spiritual importance.

The following methodology will be used to undertake the social impact assessment:

- *Surveying and Marking the Dam Inundation Boundary* - the study will survey the applicable contour and mark the boundary of the inundation area by way of visible pegs or markings at suitable spacing and relative to the accessibility and use of the areas adjacent to the river and in the vicinity of the inundation area. Once this has been completed, the consultant will arrange for a site visit with the traditional authority chiefs and councillors to show the exact implications of inundation.
- *Social and Resource Mapping* - physical resources such as the homesteads, water sources, cattle posts, grave sites and other potential resources will be mapped
- *Socio-Cultural Assessment* - since social change and especially cultural erosion is seen as one of the major potential impacts of the dam, a well-respected and experienced professional who has worked amongst the Himba for many years will do an assessment of the Himba culture, how it has changed over the years, determine the underlying values that drive the specific social organisation and determine the key drivers that are likely to lead to social and cultural change.
- *Understanding Livelihoods, Ownership of, Control over and Access to Resources and Service Delivery* - it is necessary to understand the sources of livelihoods, the community assets and the ownership, control and access arrangements over the resources that are used by the impacted communities to make a living. Only once this is understood can realistic approximations of the impacts of the project on the sources of livelihoods and the control over those resources be made.
- *Perceptions on the Increase in Social Pathologies and the reasons for it* - through a focus group discussion the extent to which a number of social pathologies occur, the reasons for differences between places, and the underlying causes will be discussed to understand its potential impacts.
- *Assessing the likelihood of Elite Capture* - The likelihood of elite capture of benefits by external, more knowledgeable and more powerful, parties can only be assessed through evaluation of the extent to which this has already taken place in areas within the Kunene Region which developed significantly since independence. A good approximation will be obtained through a reconnaissance assessment of business, tourism and employment opportunities captured by local Himba people versus those captured by people from the other regions in Namibia or from other countries. This should provide a good approximation of who is likely to capture the potential benefits of the dam if no control is exercised over the distribution of those benefits.
- *Integration of Study Components and Impact Assessment and formulation of mitigation options* – based on the above studies, the impacts will be

identified and assessed to determine the likely magnitude of the impact on the affected communities. Mitigation options will then be formulated.

- *Resettlement Action Plan* - since some households will need to be resettled to a different locality or localities and alternative grazing areas will need to be identified, a Resettlement Action Plan will be prepared in accordance with the World Bank operational guidelines for involuntary resettlement (OP 4:12).
- *Integration with other specialist studies* - the archaeological study as well as the study of grazing areas and other botanical resources is important for the social assessment and these will inform each other. Where possible, work will be coordinated and results will be fed back to ensure that the social assessors have it available for the assessment of impact magnitude.

The SIA specialists will integrate the study methodologies and outcomes in both countries, to ensure impacts in both Angola and Namibia are identified to the same degree of detail and accuracy.

### *9.3.2 Health Impact Assessment*

The aim of the Health Impact Assessment (HIA) aspect of the study is to determine the potential effect that construction and operation of the Baynes Hydropower Project will have on the local communities' health and the capacity of local health services to cope with any increased demand for services in terms of equipment, trained personnel, medicines and the balance between the community and workforce needs.

The objectives of the HIA are:

- To identify and evaluate all short, medium and long term impacts of the project on the health of all stakeholders in all project phases within an agreed geographical boundary so that any potential negative impacts can be reduced or avoided, and positive impacts enhanced.
- To recommend and justify specific, practical measures for mitigating negative and enhancing positive health impacts.

The HIA does not address issues of occupational health and safety.

The main focus of the health impacts will be the Himba communities near to the dam site; affected Himba communities will be determined by the social studies and the same groups will be considered for health impacts. However, health impacts in Opuwo will also be addressed, reflecting the potential for communicable, including sexually transmitted, infections to impact this town.

Due to the need to consider capacity of hospitals, clinics etc, to deal with the potential extra demands that the existence of the Project may place upon them (especially during construction), the health of residents in these towns will also need to be considered, as will the status of the clinics in these locations. Based on the previous studies undertaken, this will include (but will not

necessarily be limited to) the health stations at locations such as Onkokwa and Opuwo.

In Angola the health of communities and access to health infrastructure will be considered at Iona and Tombwa.

### *9.3.3 Cultural Heritage and Archaeology*

The objective of the specialist archaeological study of the Baynes area will be to provide a reliable archaeological baseline upon which to assess potential impacts on the archaeological resource, and to contribute to that assessment. This would effectively entail an extension of the Epupa survey coverage into the proposed project area, using the same methods as previously, including a combination of sampling quadrants and transects covering the whole of the intended project footprint, using standard methods of field recording to accumulate a site database.

The field survey of the Baynes project area will allow some testing of conclusions drawn from the Epupa survey, and the combined database for the area will provide a solid basis for impact assessment and mitigation proposals.

The method of assessing archaeological significance and vulnerability will be the same as is now applied in the region, ie two independent scales of 0 – 5 allowing independent ranking of archaeological significance and vulnerability using explicit criteria, and allowing calculation of ratio values for each site. The sites will be assessed both individually and as coeval as landscape units, where possible.

## *9.4 PUBLIC PARTICIPATION*

The requirements for Public Participation during the ESIA phase are detailed in the Public Consultation and Disclosure Plan (PCDP) (see *Chapter 7* and *Annex A*).

Public participation during the ESIA phase will include the following activities:

- Public feedback meetings to directly affected communities, to provide these communities with feedback with respect to the ESHIA findings of the scoping phase, and to share the Terms of Reference for the second phase of the ESHIA.
- Public feedback meetings in Windhoek, Opuwo, Namibe, Tombwa, Iona and Luanda, to provide the public with feedback with respect to the findings of the ESIA scoping phase, and to share the Terms of Reference for the second phase of the ESIA.
- Continuous contact with the traditional leaders during fieldwork. The Community Liaison Officer appointed to the project team (and approved

by the community as a representative) will keep the traditional leadership informed about all aspects of fieldwork.

- A mitigation alternatives workshop with directly affected communities, to provide feedback to communities on the findings of the various studies, to describe the key impacts and to present mitigation alternatives for discussion and comment (the views of affected communities being a very important part of evaluating the acceptability and viability of the options identified).
- Community Feedback Meeting to present the ESIA, mitigation measures and resettlement action plan framework to the community for comment and amendment.
- Public feedback meetings in Windhoek, Opuwo, Namibe, Tombwa, Iona and Luanda, to provide the public with feedback with respect to the ESIA findings and mitigation measures proposed.
- Disclosure of Draft Scoping Report and Draft ESIA Report for public comment and review before finalising.

Chapter 10

# Next Steps to be undertaken in Phase 2 (ESIA Report and ESMP Framework)

# 10 NEXT STEPS TO BE UNDERTAKEN IN PHASE 2 (ESIA REPORT AND ESMP FRAMEWORK)

As described in *Chapter 1*, the ESHIA process consists of two phases:

- Phase 1 – Scoping; and
- Phase 2 – Baseline, Impact Assessment and Framework Environmental and Social Management Plan (ESMP).

This Scoping Report summarises the outcomes of the Scoping component of the ESIA process undertaken for the proposed Baynes Hydropower Project for the Governments of Angola and Namibia, through the PJTC (Phase 1). The report will now be submitted for I&AP comment, whereupon Phase 2 of this project will commence. Each phase of the Project and the various steps for each phase, are illustrated in *Figure 10.1* below.

During the Scoping Process, a number of preliminary impacts were identified due to the proposed activities (*Chapter 8*). At this stage, no environmental, social or health fatal flaws were identified that indicate that the proposed activity is not feasible.

Several environmental, social and health issues have been identified which require further investigation, as part of an ESHIA. Detailed Terms of Reference for the specialist studies and other processes (*Chapter 9*) have been compiled to address these issues of concern, and include:

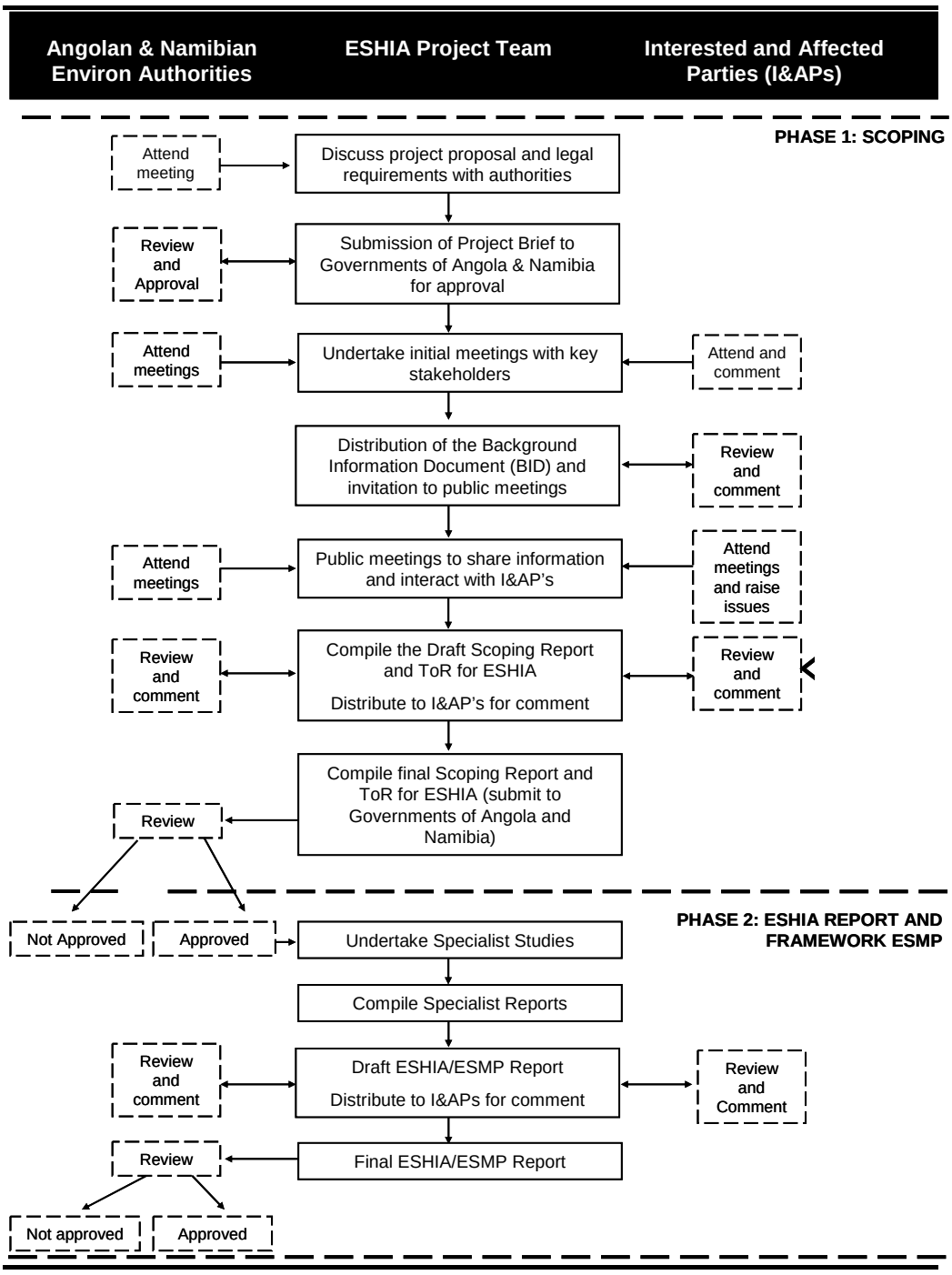
- Physical Environment and Resources, including:
  - Environmental Flow Assessment;
  - Kunene River Mouth Hydrodynamics Study; and
  - Groundwater Quality.

- Biodiversity and natural resources, including:
  - Terrestrial Flora;
  - Terrestrial Fauna and Avifauna;
  - Limnology and River Ecology; and
  - Fish and Fisheries.

- Social, socio-economic and cultural resources, including:
  - Social Impact Assessment;
  - Health Impact Assessment; and
  - Cultural Heritage and archaeology; and

- Public Participation

*Figure 10.1 ESHIA Process*




The outcome of the independent specialist investigations, including information on the potential impacts of the activities as well as proposed mitigation measures, will be presented in a draft ESHIA Report, the results of which will be presented to the public at various public meetings (*Figure 10.1*) and in accordance with the Public Consultation and Disclosure Plan (*Annex A*).

The draft ESHIA report and Framework EMP will be disclosed to all stakeholders and a formal public comment period will then be allowed for stakeholder input prior to finalising the report. The Final ESHIA report and Framework EMP will be produced, including a Comments-Response report

which will reflect all the comments and inputs from I&APs. The ESHIA report and Framework EMP will then be submitted to the Governments of Angola and Namibia for review and final decision. Once a Record of Decision (RoD) is issued, the ESHIA consultants will inform the stakeholders of the decision and the intended course of action. Subject to approval of the report and issuing of the environmental license, all associated activities shall be governed by the Framework EMP.

Chapter 11

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Annex A

# Public Consultation and Disclosure Plan (PCDP)




# PUBLIC CONSULTATION AND DISCLOSURE PLAN

REPUBLIC OF NAMIBIA

REPÚBLICA DE ANGOLA

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URBAN DYNAMICS
TOWN & REGIONAL PLANNERS

ERM

# Baynes Hydropower Project

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# 1 INTRODUCTION

The “Lower Cunene Hydropower Scheme Feasibility Study” was conducted from 1995 to 1997. This study was aimed at providing basic information about the feasibility of the proposed project and was funded by the Governments of Norway and Sweden. The proposed project soon became controversial with the local Himba people and international environmental organisations heavily criticising the project for its potential impact on the environment and the local indigenous population. Key criticisms were based on the alleged failure to achieve effective public participation, lack of respect for the Himba and questions about the viability of the project. Different variations of the scheme emerged from this study. The “Epupa Site” would have been the more viable alternative because of its larger storage ability but would have been more disruptive of Himba Life because it would require the flooding of a broad valley extensively used by herders and farmers. The valley holds important resources and culturally important sites for the local Himba. It would also have flooded the Epupa Falls.

A review of the project, published in the Georgetown Environmental Law Review by Sydney Harring, (which is highly critical of the proposed project), argues that the Baynes site which is located some 40km downstream from the Epupa Falls, in contrast, would create more technical difficulties and higher construction cost, but would displace far fewer people because the mountainous area is much less inhabited or used for grazing.

Namibia reportedly preferred the Epupa Site while Angola favoured the Baynes site. Opposition to the plans by local and international NGO’s and refusal of the Himba to accept the dam to be built at the Epupa site saw the project being shelved and caused the two Governments to consider other alternatives.

Ten years later, the power generation situation in Southern Africa has changed dramatically with serious shortages starting to emerge and the Governments decided to reconsider the possibility of power generation from the lower Cunene. To this end, a Techno-Economic Consultant consisting of a consortium of four Brazilian companies has been appointed to investigate the technical feasibility and economic viability of developing a hydropower scheme at the Baynes site. In addition, Environmental Resources Management (ERM) was appointed to undertake an independent Environmental, Social and Health Impact Assessment (ESHIA) on the proposed project.

Judging from initial consultations with the Kunene Regional Council, it will be difficult to restore confidence in the participation process, especially among the local Himba Community because of their perception that their interests were largely ignored in the previous study, that they were treated in a disrespectful manner and that they were only consulted as an afterthought.

General stakeholder management was ineffective and this contributed to national and international resistance to the project, something which is still lurking in the minds of individuals and organisations that were involved.

The importance of effective and broad public participation in the ESHIA process can therefore not be overstressed. It requires a well thought through plan designed to ensure that the mistakes made in the past are not repeated and that the negative and emotive perceptions that exist can be dealt with as effectively as possible.

Communication with stakeholders is an important part of the way that a project proponent must conduct its business, and communication with the project stakeholders is an essential component of any environmental and social impact assessment process. The project proponent in this case is the Governments of the Republic of Namibia and of Angola, represented by the Permanent Joint Technical Commission (PJTC). The PJTC and the consultants appointed to conduct the ESHIA are committed to active and ongoing communication with all communities, organisations, groups and individuals with an interest in the proposed Baynes Hydropower Project. To this end, the PJTC issued a Public Consultation and Disclosure Policy for the Baynes Hydropower ESHIA. This PCDP is designed to put this policy, which reflects international best practice, into effect.

## 2 OBJECTIVES OF THE PCDP

This document outlines the Public Consultation and Disclosure Plan for the ESHIA for the Baynes Hydropower Project in the lower Cunene River. It seeks to define a technically and culturally appropriate approach to and programme for public consultation and disclosure. It is a live document and will be subject to amendment as and when it is regarded as necessary. The objectives of the plan are:

- 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;
- To ensure that adequate provision is made to consider and resolve grievances, and
- To ensure that effective communication will continue during the construction and operational phases of the proposed project.

# 3 PROJECT OVERVIEW

The potential of the Cunene River as a location for a hydropower project was first considered by colonial powers at the turn of the 19th century. Since then dams and weirs have been constructed along the river including Gove Dam and Ruacana. However political changes and instability have hindered efforts to construct an additional hydropower project. In the early 1990s the Governments of Namibia and Angola got together and ratified the previous Cunene River Agreements. This paved the way for a feasibility study on the construction of a hydropower scheme in the lower Cunene River. Various alternatives were investigated but the project ran into difficulties with the refusal of the local Himba population to accept the project and questions about its viability.

## 3.1 THE EPUPA SCHEME

The Epupa scheme proposed a single dam and power station 7 km downstream of the Epupa Falls with a capacity of 360MW. The scheme was not reliant on any other dams or weirs in the area being operational. This was the preferred technical option of three schemes that were initially proposed and was considered to be technically feasible and the most economically viable. The Epupa Dam would, however, have inundated the Epupa Falls, permanently flooding 161 $km^2$ and covering an extended area at full capacity of up to 380 $km^2$ of land. This would have resulted in the flooding of 130 Himba graves, the loss of seasonal garden land and high quality pasture land, and would have affected 3,500-4,000 people dependent on the land. In addition, flora would have been lost along with terrestrial habitats of birds and monkeys, although a water source and aquatic habitat for birds would have been developed. The Epupa Falls would be completely inundated and the expected water loss through evaporation from this large surface would be significant. The project was predicted to also lead to a range of other consequences resulting from increased infrastructure in the area, increased accessibility and an influx of mainly male workers to construct the dam and power station.

The Epupa Dam project met with strong opposition from the Himba community and some international non-governmental organisations (NGOs.) Objections centred on:

- land and water rights in the project area;
- impacts on the Himba's cultural traditions and way of life;
- changes to the health of the Himba;
- feasibility of any social mitigation measures including resettlement;
- long term economic viability;
- feasibility in terms of future water availability and drought;
- habitat and biodiversity changes;
- changes to water in the river in terms of flow and quality;
- changes to the river at the delta and mouth of the river; and
- preference for development of the Kudu Gas Field.

Many of these issues could not be addressed in previous studies due to a difficulty to access and the refusal of some local communities to discuss project alternatives and compensation schemes. The fact that the two Governments could not reach agreement as to which project to develop, left NamPower with no option but to pursue the building of a 400 kV line to South Africa. This line caused the Epupa and Baynes Projects to be shelved until now.

## 3.2 THE BAYNES ALTERNATIVE.

The water resource of the Cunene River is substantial and although year to year and annual variation of flow is considerable, being a perennial river with a high mean annual flow the project offers considerable potential. The

PJTC is presently re-considering the option of a hydropower project at Baynes. The project could harness the potential of the Cunene River to supply both Namibia and Angola with a reliable source of power which will meet their future requirements and reduce reliance on other nations such as South Africa.

The Baynes Hydropower alternative is now being considered as an appropriate, cost effective way to provide power after the rejection of the Epupa Hydropower project. The Baynes Project involves the construction of a hydropower project on the Cunene River 40 km downstream of the Epupa Falls with an operating capacity which is still to be determined. The Baynes Dam would be 200 meters high and would permanently flood an area of approximately 19 $km^2$ with an estimated maximum of 57 $km^2$ at peak level. This will have much less of an impact on traditional lands but it is estimated it will inundate some 10- 15 Himba graves. At the same site turbines will be installed along with a power plant, switch plant and ancillary structures. Power lines will be constructed from the plant to the nearest substations (subject to a separate EIA process). The Baynes Hydropower Station would not affect the Epupa Falls as these are upstream but may impact the river downstream including the river mouth.

The Governments of Angola and Namibia, through the Permanent Joint Technical Commissioned (PJTC), appointed an international consulting company **Environmental Resources Management (ERM**), to undertake an Environmental, Social and Health Impact Assessment (ESHIA) for the proposed Baynes Project. The appointment of ERM followed a competitive tendering process and rigorous evaluation of the proposals received.

ERM has its headquarters in London, but is well established with offices in most regions of the world, including Southern Africa. The team for the EIA includes substantial local expertise in Namibia and Angola, especially in the environmental and social fields.

In parallel with the EIA, a techno/economic study is being conducted by a Brazilian consortium. The two teams are independent of each other, but they will collaborate closely so that their respective studies are coherent and consistent, thus enabling objective decision making by the two Governments.

The ESHIA shall provide decision-makers and stakeholders with a comprehensive evaluation of the impacts of the project on the natural and human environments, taking into account their local, regional, national and international importance. This will be done through a combination of scientific studies and stakeholder consultation. The ESHIA will include public participation that will enable the relevant government agencies, parastatals, NGOs, the interested public in Angola and Namibia, and the affected communities in the project area, to voice their concerns, opinions and ideas about the project.

# 4 INTERNATIONAL AND NATIONAL REGULATIONS AND REQUIREMENTS

It is imperative that the public consultation and disclosure process satisfy international best practice. To this end a number of international guidelines shall be adhered to in the PCD process for this project. These include the International Finance Corporation, the Equator Principles, Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes and National Laws and Guidelines.

## 4.1 EQUATOR PRINCIPLES

Lenders that may become involved with the project will seek to ensure that the project is developed in a manner that is socially responsible and reflects sound environmental management practices. The principles state that "We believe that adoption of and adherence to these Principles offers significant benefits to ourselves, our borrowers and local stakeholders through our borrowers' engagement with locally affected communities" (Equator Principles, 2006).

Key principles that are relevant to stakeholder engagement include Principle 2: Social and Environmental Assessment which highlights the requirements for "consultation and participation of affected parties in the design, review and implementation of the project" (Equator Principles, 2006). Principle 5: Consultation and Disclosure states that:

> *"for all Category A and as appropriate, Category B projects located in non-OECD countries the government, borrower or third party expert has consulted with project affected communities in a structured and culturally appropriate manner.*
>
> *For projects with significant adverse impacts on affected communities, the process will ensure their free, prior and informed consultation and facilitate their informed participation as a means to establish, to the satisfaction of the EPFI, whether a project has adequately incorporated affected communities' concerns.*
>
> *The assessment documentation and AP or technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation including any actions agreed resulting from the consultation. For projects with adverse social or environmental impacts, disclosure should occur early in the Assessment process and in any event before project construction commences, and on an ongoing basis." (Equator Principles, 2006)*

The Environmental Assessment and Environmental and Social Management Plans (ESMP) must take account of public consultation for Category A projects[1] (such as this one) and will be subject to an independent expert review.

The Equator Principles also have specific requirements in relation to grievance mechanisms. Equator Principle 6: Grievance Mechanism states that:

> *"for all Category A and, as appropriate, Category B projects located in non-OECD countries to ensure that consultation, disclosure and community engagement continues throughout construction and operation of the project, the borrower will, scaled to the risks and adverse impacts of the project, establish a grievance mechanism as part of the management system. This will allow the borrower to receive and facilitate resolution of concerns and grievances about the project's social and environmental performance raised by individuals or groups from among project-affected communities." (Equator Principles, 2006)*

The project may be seeking financing from international finance institutions that are signatories to the Equator Principles. Equator Principle 3, which relates to applicable Social and Environmental Standards, states that for

[1] *As part of their review of a project's social and environmental impacts, EPFIs use a system of social and environmental categorization, based on IFC's environmental and social screening criteria, to reflect the magnitude of impacts understood as a result of assessment. These categories are:*
*-**Category A** – Projects with potential significant adverse social or environmental impacts that are diverse, irreversible or unprecedented.*
*-**Category B** – Projects with potential limited adverse social or environmental impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures; and*
*-**Category C** – Projects with minimal or no social or environmental impacts.*

projects located in non-OECD countries the Social and Environmental Assessment will refer to the applicable IFC Performance Standards.

## 4.2 IFC PERFORMANCE STANDARDS

### 4.2.1 Performance Standards for Stakeholder Engagement

Although all of the Performance Standards have relevant social aspects to them the key ones considered when designing the PCDP and in working towards the Stakeholder Engagement Plan are summarised in Table 1.

**Table 1: Summary of IFC Performance Standard Requirements for Stakeholder Engagement**

| Standard | Key Components |
|---|---|
| **Performance Standard 1:** Social and Environmental Assessment and Management Systems | • Pertains to projects with social and environmental risks and impacts that ought to be managed in the early stages of project development and be ongoing throughout the life of the project. This approach necessitates the participation of IAPs in the process.<br>• Highlights the importance of managing the social and environmental performance throughout the life of a project. A social and environmental management system must be established and maintained and be proportionate with the level of social and environmental risks and impacts. The development of a PCDP is recognised as a tool in such a management system. |
| **Performance Standard 2:** Labour and Working Conditions | • Recognises that the pursuit of economic growth through employment creation and income generation should be balanced with the protection of basic rights for workers.<br>• Acknowledges that constructive worker-management relationships and safe and healthy working conditions may enhance the efficiency and productivity of operations. |
| **Performance Standard 4:** Community Health, Safety & Security | • Recognises that project activities, equipment and infrastructure bring benefits to communities including employment, services and opportunities for economic development. However, the project can also increase the potential for community exposure to risks from development.<br>• Where project activities pose risks of adverse impacts on the health and safety of affected communities the developer is required to make available relevant information (including the details of an Action Plan), in an appropriate form, to affected parties and government authorities so that they can fully understand the nature and extent of the risks. |
| **Performance Standard 5:** Land Acquisition and Involuntary Resettlement | • In such instances the developer will undertake extensive consultation and negotiation with affected parties. Such communication will include transparent access to project related information in a timely fashion to enable people to plan for the future. Here public participation will include the establishment of appropriate representative forums through which resettlement and compensation are discussed. Most of this consultation is part of the SIA and Resettlement Action Plan but it should be recognised as a component of the PCDP.<br>• Although resettlement is ALWAYS seen as a last resort, this Standard recognises that involuntary resettlement occurs as a result of projects and refers to both physical and economic displacement as a result of project related land use. Resettlement is considered involuntary when affected individuals or communities do not have the right to refuse land acquisition that results in their displacement.<br>• Consultation shall also take place with host communities. |
| **Performance Standard 6:** Biodiversity Conservation and Sustainable Natural Resource Management | • Recognises that protecting and conserving biodiversity in all its forms is fundamental to sustainable development.<br>• Where the project has potential impacts on legally protected or critical habitats consultation with relevant authorities, specialists and communities must be undertaken. |

| Standard | Key Components |
|---|---|
| **Performance Standard 7:** Indigenous Peoples | • Recognises that indigenous groups in a project area can be at particular risks which may include loss of identity, culture, traditional lands and natural resource based livelihoods.<br>• Recognises the need for early engagement with indigenous groups, should they be affected, to build longer term processes of consultation, informed participation and good faith negotiation.<br>• Establish means for the full development of these people's own institutions and initiatives and in appropriate cases, provide the resources necessary for this purpose. |
| **Performance Standard 8:** Cultural Heritage | • Recognises the importance of cultural heritage for current and future generations and is consistent with the convention concerning the protection of the world's cultural and natural heritage.<br>• Where sites of cultural heritage are potentially impacted by the project the developer will consult with local communities as well as relevant national authorities responsible for the maintenance of such sites. |

### 4.2.2 Grievance Resolution

The Equator Principles and IFC Performance Standards also place emphasis on the establishment of a grievance mechanism. Key requirements for developing and implementing a grievance mechanism are highlighted in each of the Performance Standards:

PS1 - Social and Environmental Assessment and Management

> *"The client will respond to communities' concerns related to the project…will establish a grievance mechanism to receive and facilitate resolution of the affected communities' concerns and grievances about the client's environmental and social performance"*

PS2 - Labour and Working Conditions

> "*The client will provide a grievance mechanism for workers (and their organisations,…) to raise reasonable workplace concerns…use an understandable and transparent process that provides feedback to those concerned"*

PS4 - Community Health, Safety and Security

> *"A grievance mechanism should allow the affected community to express concerns about the security arrangements and acts of security personnel"*

PS5 - Land Acquisition and Involuntary Resettlement

> *"The client will establish a grievance mechanism …to receive and address specific concerns about compensation and relocation that are raised by displaced persons or members of host communities…"*

## 4.3 Convention on the Protection and Use of Trans-boundary Watercourses

The main objective of this convention is to prevent, control or reduce any trans-boundary impact resulting from the pollution of trans-boundary waters caused by human activity. Article 16 of the convention contains requirements for public information. Under these requirements, the parties have to ensure that information on the condition of trans-boundary waters, measures taken to control, reduce and mitigate trans-boundary water pollution and effectiveness of these measures are made available to the public. The information that has to be made available to the public includes:

- Water quality objectives (see guidelines for developing Water Quality Objectives and Criteria in Annex III of the Convention)
- Permits issued and the conditions required to be met; and
- Results of analysis of water sampling carried out for monitoring and assessment, and results of checking compliance with water quality objectives.

The parties have to ensure that the information is made available to the public of their states and is free of charge. Copies of the information must be provided to the riparian parties for reasonable payment.

## 4.4 NAMIBIAN ENVIRONMENTAL LEGISLATION AND GUIDELINES

The Environmental Management Act, 2007 (Act 7 of 2007) under the principles of environmental management, clause 3 (2) states the following:

*(a) Renewable resources must be used on a sustainable basis for the benefit of present and future generations;*

*(b) Community involvement in natural resources management and the sharing of benefits arising from the use of the resources, must be promoted and facilitated;*

*(c) the participation of all interested and affected parties must be promoted and decisions must take into account the interest, needs and values of interested and affected parties;*

*(d) equitable access to environmental resources must be promoted and the functional integrity of ecological systems must be taken into account to ensure the sustainability of the systems and to prevent harmful effects;*

However, the Draft Regulations providing more details on the assessment process are not yet gazetted. The Draft Regulations deal with the consultation process under section 3.4 which determines that project proponents shall make all information about the project available to interested and affected parties, shall provide opportunity for such parties to comment or make representations, and provide feedback. In cases where a project may have an impact on a neighbouring state, this shall be brought to the attention of the Competent Authority and the applicable neighbouring state.

## 4.5 ANGOLAN ENVIRONMENTAL LEGISLATION AND GUIDELINES

*Decree 51/04 on Environmental Impact Assessment (EIA)* was established under Article 16 of the *Environmental Framework Law (Law 5/98)*. This decree is supplemented by (*Decree 59/07: on Environmental Licensing*). These Decrees provide guidance on:

- which projects are subject to an EIA;
- what elements are to be included in an EIS;
- the nature and extent of public participation;
- the entity responsible for compliance with these legal requirements;
- the EIA monitoring process; and
- what types of environmental licenses are issued.

Under the terms of *Decree 51/04*, the required Environmental Impact Study (EIS) should include, but not be limited to:

- A description of Project (including a non technical description);
- A description of the activities to be undertaken;
- A general description of the environment at the site;
- The Environmental Impact Study; and
- All technological alternatives and location of the project, bearing in mind the probability of non-execution of the Project.

Furthermore, of relevance to the PCDP decree 51/04 explicitly mentions:

*the social and economic medium, use and occupation of soil, use of water and the social and cultural component, highlighting archaeological sites and monuments, history and cultures of the community, the interdependency between the local community, environmental resources and the potential future use of these resources.*

The public consultation and disclosure as outlined in *Article 10 of Decree 51/04* is limited to the disclosure of a non-technical summary of the EIA highlighting the key impacts of the project and proposed mitigation measures. The provisions allow for a public consultation period of five to ten days, at which time the public is allowed to present comments. It should be noted that the MinEnv, through the above-mentioned Directorate, has responsibility for promoting the public consultation process.

# 5 ROLES AND RESPONSIBILITIES

This section confirms the roles and responsibilities of those involved in the execution of the ESHIA public consultation and disclosure process. Some of the major flaws of the Epupa EIA and Feasibility Process were:

- the perception that the Government has put undue pressure on the directly affected parties to accept the proposed project,
- the directly affected communities were treated with disrespect, and
- that intimidation by the police was used to subdue local opinions and resistance to the proposed project.

To prevent this from happening again, it is important to clearly define the roles and responsibilities of the various players in the public consultation, participation and disclosure process.

## 5.1 ROLES AND RESPONSIBILITIES OF THE PROJECT PROPONENT

The Angolan and Namibian Governments, through the PJTC, are responsible for ensuring that conditions are conducive for a transparent and efficient public participation and disclosure process. In particular they must:

- Support the consultants by giving them free access to national, regional and local government structures;
- Provide information freely to the consultants;
- Remove unnecessary administrative and bureaucratic hurdles;
- Avoid provocative or controversial statements;
- Avoid manipulating stakeholders or pressurizing anyone to adopt a position about the project;
- Assist the Consultant Team in explaining the need for, rationale of and details of the project in a neutral way;
- Assist the Consultant Team to respond to technical questions and queries about the project in a neutral and non-defensive way; and
- Facilitate or enable the Directly Affected Communities to participate meaningfully in the ESHIA.
- Issue all press releases.

## 5.2 ROLES AND RESPONSIBILITIES OF THE ESHIA TEAM

The ESHIA team will take full responsibility for all public participation, consultation and disclosure activities related to the ESHIA.

This responsibility includes but is not limited to:

- Identification of the key stakeholders and preparation of the Stakeholders list.
- Preparation of the PCDP and confirmation of this plan as acceptable to stakeholders, especially with the directly affected communities.
- Negotiating access into the affected area for the ESHIA team and determining the conditions of such access with the directly affected communities.
- Building capacity for effective participation.
- Ensuring appropriate and effective public disclosure of all information pertaining to the ESHIA.
- Arranging for and facilitating all public consultation, participation and disclosure events.

- Setting up effective channels of communication with all stakeholders and use existing forums for discussions when appropriate.
- Providing regular feedback to all stakeholders with respect to the findings of the consultation process and the recommendations of the specialists.
- Ensure that the consideration of mitigation measures is done in a participatory manner with the directly affected communities.
- Monitor the work of the specialists and ensure that they are operating in accordance with the agreements between the communities and the consultant.

Following the identification of the key stakeholders and the social and natural assets likely to be affected, the ESHIA Team is responsible to prepare a Public Participation and Disclosure Plan to constructively engage the stakeholders in the project. Consultation is critical in contributing to a sense of ownership of the project and/or its outcomes by the stakeholders and the plan must include mechanisms for participation by stakeholders in decision-making throughout **project planning**, **implementation**, and **evaluation**.

On a practical level, the ESHIA Team will take responsibility for the organisation of all aspects of consultation meetings and workshops inclusive of minute taking and recording of issues raised and commitments made. The team is also responsible for the distribution of all ESHIA documents for review and comment as well as for limited translation of these documents into Portuguese to the benefit of the Angolan stakeholders.

The team will actively participate in all consultation meetings as well as workshops and public hearings and will also be responsible to respond on concerns and ideas raised through public consultation, the allocation of project funds for public consultation and draw down on budgets dedicated to capacity building for participation. It is also responsible to ensure that all public consultation and disclosure requirements of international agencies are met, inclusive of the documentation of results.

The ESHIA Team, within this context is further responsible to advise the proponent on the structure of the consultation process where requested by the project proponent.

# 6 CONSULTATION AND DISCLOSURE METHODOLOGY

## 6.1 OVERVIEW

The proposed project is an emotive one, rich in history and controversial in some aspects. During the initial outreach to regional government in the Kunene Region and early representations by the directly affected community, the ESHIA Team became aware of the distrust or scepticism that exist within not only the directly affected communities but also within the ranks of certain national and international NGOs and a variety of other stakeholders. This methodology sets the objectives and specific actions required to reach the objectives related to specific elements of public consultation and disclosure regarded as essential to ensure a rigorous consultation and disclosure process which can withstand local and international scrutiny and satisfy international best practice principles. The key elements addressed are:

- Broad based and effective public consultation and participation
- Identifying and addressing issues
- Managing public participation communications
- Participation in decision making
- Stakeholder and media management
- Stakeholder participation in management and monitoring.

## 6.2 BROAD BASED AND EFFECTIVE CONSULTATION AND PARTICIPATION

### 6.2.1 Objectives

To ensure broad based and effective consultation and participation, five objectives need to be achieved. These are the effective management of cross-cultural issues, ensuring that all who wish to partake can do so easily, ensuring that there is adequate capacity within directly affected communities to participate meaningfully, ensuring that there are adequate resources within directly affected communities to participate effectively, and focusing on the correct consultation area.

### 6.2.2 Methodology

#### *6.2.2.1 Effective management of Cross-Cultural Issues*

The directly affected population has particular cultural beliefs and practices. It is important that all team members understand these and abide by them as far as possible. In particular, due respect must be accorded at all times to the chiefs and general population in the affected area. This requirement cannot be overstressed. To ensure that this happens, IRDNC staff will write a short brief of the do's and dont's of working and communicating with people in the Kunene Region and the Namibe Province. All team members will be required to follow these guidelines diligently and carefully.

A local liaison officer will be appointed to be available within the consultation area and communicate with the local leadership or its representatives. Before entering the consultation area, each team member or specialist will be required to inform the liaison officer about the nature of the work to be done, the localities where it will be done and the assistance required, if any. The liaison officer will then inform the local leadership or representatives in both countries about the visit and assist the team member(s) to bring the necessary courtesy visits and ask permission to do the required visits.

During the scoping phase, all visits, meetings and events with the directly affected population will be arranged by the manager of the public participation process and team members will be informed accordingly.

#### *6.2.2.2 Comprehensive Stakeholder List*

Stakeholder identification is undertaken to determine all of the organisations and individuals who may be directly or indirectly affected (positively or negatively) by the proposed development and who may be able to contribute to the programme of work due to their expert knowledge of and/or experience in the project area. To develop an effective stakeholder involvement programme it is necessary to determine exactly who the stakeholders are. This is due in part to recognition of the fact that different methods may be required to effectively involve the various stakeholder groups. In addition, different issues are likely to be of prime concern for each of these stakeholder groups.

In order to ensure that all potential stakeholders are identified and effectively consulted, the team will ensure that all stakeholders in the following categories in both countries are included in the list:

- ✓ Local communities.
- ✓ Community Based Organisations.
- ✓ General Population of Namibia and Angola.
- ✓ Local Non-Governmental Organisations.
- ✓ National Non-Governmental Organisations.
- ✓ International Non-Governmental Organisations.
- ✓ United Nations and Bilateral Agencies.
- ✓ Academic and research institutions.
- ✓ Project proponent.
- ✓ The Governments of Namibia and Angola and their various ministries and government agencies.
- ✓ Project Partners.
- ✓ Individual experts who contributed to the Epupa debate during the previous assessment.
- ✓ Individuals who wish to contribute in their private capacity.

To ensure that all individuals and organisations are included under these categories, the team will, based on stakeholder lists of the previous project, other existing stakeholder lists and the stakeholder list provided by the Kunene Regional Council and Namibe Province, prepare a preliminary stakeholder list. This list will then be forwarded to various organisations to check it for completeness and to add any additional stakeholders.

Within the local communities, the stakeholder list will be discussed at the first meeting and checked for completeness. A brief project description will also be published in local newspapers in Namibia and Angola with an open invitation to register as a stakeholder of the proposed project.

#### *6.2.2.3 Capacity Building*

It is important to ensure that the directly affected population is able to participate in the process. This cannot be achieved without ensuring that they are capacitated to fully understand the scope and implications of the proposed project. This must be achieved before a final scoping exercise where it is beyond doubt that they can contribute on the basis of understanding the process and understanding the detail implications of the proposed project. To ensure this, the team will, prior to the final scoping meeting with directly affected communities, present the detail of the proposal to the traditional leaders and community members. In addition, a representative group, selected by the community will be taken to the site to clarify the proposals on the ground and enhance understanding of the implications of the proposal.

The presentation will be in the form of visual aids and maps which will show the dam inundation area, the positions of all other supporting infrastructure, the local landmarks using local names and any other features such as cattle posts, water points, river-crossing points, grave sites, significant riverine vegetation and any other local features that may be identified.

The site visit will be by vehicle and on foot using GPS locations to show the boundaries of the inundation area at certain places, the localities of the supporting infrastructure and the alignment of the power line that will be associated with the scheme.

#### *6.2.2.4 Enabling effective participation*

Given the remoteness of the region and the low population density, it is very difficult for local people and traditional leaders to attend meetings and also hold their own consultative meetings with their constituents. This difficulty has already been communicated to the ESHIA team. To resolve this problem and enable the directly affected community to participate effectively, a budget and disbursement procedure will be included in phases one and two of the ESHIA. This budget will be earmarked for transporting community members or their representatives to meetings and workshops, provide for food during those events. For Phase 1, the consultant team will prepare a budget for submission to the PJTC to enable local communities to attend the scheduled meetings and consult with their representatives. The detail of the budget and disbursement methods will be discussed with the community during the approval meeting for this plan.

#### *6.2.2.5 Identifying the consultation area*

Although the proposed scheme will have a definable direct impact in the form of the inundation area and the supporting infrastructure, land use patterns indicate that communities far beyond those boundaries is likely to be affected. Without understanding the land use and transhumance patterns of the Himba, the consultation area will be defined in collaboration with the directly affected communities during the PCD consultative meeting, which will be the first consultative event in the engagement programme. However, this will not be regarded as fixed and will be amended if found necessary or on the advice of the local communities and specialists in the area.

## 6.3 IDENTIFYING AND ADDRESSING ISSUES

### 6.3.1 Objectives

To ensure the effective identification of key issues and to enable the team to address the issues effectively, three objectives need to be achieved. These are:

- to ensure an effective scoping methodology;
- to ensure appropriate disclosure of all the detail related to the proposed project; and
- to manage the issues that are raised effectively and transparently.

The following methodologies will be used to achieve these objectives.

### 6.3.2 Methodology

#### *6.3.2.1 Appropriate Disclosure*

Various stakeholders may require different methods and means of information dissemination to ensure that information are accessible and understandable within the given context. To ensure that the needs of all stakeholders are considered and that dissemination methodologies address these needs, a stakeholder engagement plan will be prepared. This plan will consider the specific needs of the various stakeholder groups and will detail an appropriate disclosure methodology for each of these groups. The stakeholder engagement plan and programme is discussed under section 7 of this plan.

#### *6.3.2.2 Effective scoping*

It is regarded as imperative that the scoping phase must be as effective and inclusive as possible. If inadequate attention is given to this, important issues may be omitted with the resultant negative impact on the quality of the scoping component of the ESHIA. To ensure that scoping is done effectively and comprehensively, all stakeholders will be given an opportunity to raise issues of concern. The opportunities created for such engagement for all the various groups is provided in the stakeholder engagement plan. In addition to affording all interested and affected parties (I&APs) the opportunity to raise important issues, the consultant team will also systematically work through the previous feasibility study reports, EIA reports and the multitude of articles and commentary that resulted from the previous study.

#### *6.3.2.3 Creating an issues trail*

Managing the issues that are raised is important to ensure that none are forgotten or not recorded. Stakeholders must be sure that the issues they raise are regarded as important and are considered. To ensure that nothing falls through, the manager of the public participation process will record all issues in an issues list kept centrally for that purpose. This will not only remain a list but each issue will be checked for consideration and a statement will be made in the list as to how and where each of these issues has been dealt with. It will eventually form part of the PCD report.

## 6.4 MANAGING PUBLIC PARTICIPATION COMMUNICATIONS

### 6.4.1 Objectives

The objective of this element is to ensure that communication with stakeholders is effective and that specific emphasis is placed on the particular constraints and requirements of the various stakeholder groups.

### 6.4.2 Methodology

#### *6.4.2.1 Local Liaison*

Perhaps the most challenging aspect here is the ability to communicate effectively with the directly affected communities. The area is characterised by low density, remoteness of villages and an almost complete lack of access to modern communication equipment. Local radio signals are not available everywhere and a way must be devised to ensure that all directly affected communities are fully informed about all developments related to the proposed project. In order to solve this problem and ensure good communication, a community liaison officer will be appointed to disseminate information to rural residents through physical visits to the various chiefs and their constituents in both Namibia and Angola. Communication material will be provided by the ESHIA team. The liaison officer will be required to stay in the area and have frequent visits to the local population. (S)he will be required to report back on each and every visit and to provide feedback to the manager of the participation process about all discussions and sentiments expressed by them.

#### *6.4.2.2 Translation*

Since the ESHIA is conducted in both Angola and Namibia, some stakeholders require documents and reports to be translated into the Portuguese language while it is also desirable that executive summaries of key reports be translated into the local vernaculars. During Phase One of the study, the PCDP, the issues list as well as the Draft Scoping Report will be translated into both Portuguese and the local languages to ensure that communities have the ability to read these reports and have a solid basis of knowledge from which to participate in the process.

#### *6.4.2.3 Media Releases*

All communication related to the project will also be advertised in the local press in both Angola and Namibia. This includes invitations to register as stakeholders, notifications of meetings, summaries of key results and notifications of the places where information can be obtained throughout the duration of the ESHIA. These will all be done jointly between the ESHIA team and the PJTC to ensure that both parties are in agreement on the information so published. Media releases will target national stakeholder groups in both countries and will be issued by the PJTC. The PC Managers in Angola and Namibia respectively will take responsibility for preparing press releases for approval and issuing by the PJTC.

#### *6.4.2.4 Web Site*

In addition to using the local press to convey information, a project website will be developed and all public information will be posted to this web site. This will make information accessible to all stakeholders, nationally and internationally, who have access to the internet. The web address will be made known to all stakeholders through the meetings, media releases and personal contacts.

#### *6.4.2.5 Feedback*

In assessments like this, stakeholders invariably ask for feedback about the outcomes of their inputs as well as about the decisions and the recommendations that resulted from the assessment. All of the above media as well as individual e-mail reports will be used to provide feedback to stakeholders. Feedback will be provided in the form of minutes of all meetings and resolutions of all consultative sessions and workshops throughout the duration of the ESHIA. It would also include the scoping report and localities or institutions where hardcopy documentation would lie open to the public for inspection. Discussions forums in Angola at the provincial and municipal level will also be used to provide feedback on the consultative sessions with stakeholders.

## 6.5 PARTICIPATION IN DECISION MAKING

### 6.5.1 Objectives

Public consultation and disclosure, in this case, should go beyond public meetings and feedback. It is imperative that especially the directly affected communities have an opportunity to decide how they would like to be consulted, how feedback must be provided, and to really participate in decision making related to dealing with the key issues and the design of mitigation measures. The objective of this element is therefore to ensure that stakeholders, especially the directly affected communities, have a realistic opportunity to influence decisions and recommendations resulting from the ESHIA.

### 6.5.2 Methodology

#### *6.5.2.1 Stakeholder Confirmation*

Although the ESHIA team will draft the various methodologies, plans and reports, these must be submitted to stakeholders for review and confirmation. This PCDP will be circulated internally first for comment and amendment. Thereafter, a copy will be made available to all stakeholders for information and comments will be considered. The draft will then be tabled at the first consultative meeting with the directly affected population, discussed, amended and adopted as the PCDP that will guide the ESHIA. Minutes of all consultative events will also be circulated to stakeholders for confirmation and will be adopted at subsequent meeting or events.

#### *6.5.2.2 Participation of Directly Affected Parties*

Directly affected parties will be given an opportunity to participate in decision making at various levels. To achieve this, opportunities will be created where the ESHIA team, together with the communities or their representatives, workshop key aspects of the assessment. These will mainly include the finalisation of reports, and decisions and recommendations resulting from the ESHIA. More specifically, stakeholders will be enabled and allowed to amongst others, influence the TOR for the second phase of the study, to participate in the design of mitigation and enhancement measures, to participate in the design of compensation plans and to define their own roles in the management and monitoring of the project during construction and operation phases.

#### *6.5.2.3 Demonstrating influence*

Participation without actually influencing or perceived inability to influence decisions leads to resentment and negative perceptions about the process. It is therefore important that the ESHIA Team, throughout all aspects of the study allow the inputs and contributions of stakeholders to actually influence decision making. This must also be demonstrated to stakeholders to show how much their inputs are valued and considered. The entire team will take care to continuously point out how important stakeholder inputs are and will demonstrate through specific reference, how their inputs influenced decisions on this assessment.

The issues trial will also be used to demonstrate this through accurate record keeping on who raised the issue, when and where it was raised, how it was considered, how it was resolved and the influence of stakeholder participation in finding the most suitable solution or response to the specific issue.

## 6.6 STAKEHOLDER AND MEDIA MANAGEMENT

### 6.6.1 Objectives

Neglecting stakeholders and the media often lead to both these groups using their own resources and contacts to obtain information on which to base their opinions and reactions. This in turn can easily lead to inaccurate information being presented as fact and the formation of opinions and positions based on these inaccurate "facts". The objective of stakeholder and media management is therefore to ensure that all stakeholders and the media have open access to accurate project related information.

### 6.6.2 Methodology

#### *6.6.2.1 Transparency*

Perhaps the most important requirement to limit possible misinformation is to keep all aspects of the project as transparent as possible. No information resulting from the ESHIA is regarded as confidential. Every aspect should be in the public realm and the ESHIA Team will make sure that both stakeholders and the media are regularly kept up to date on progress and about the progress with and issues raised during the ESHIA process. No hidden agendas will be allowed to develop or influence the process or the decision making during the assessment. This undertaking also ensures that stakeholders will have full disclosure of all information which will provide them with a basis for their own assessment and participation.

#### *6.6.2.2 Accessibility*

A statement that all information will be publicly available only carries weight if such information is practically accessible. To ensure accessibility to all stakeholder groups, suitable dissemination methodologies will be used to ensure that information is accessible to all. This will include local poster and exhibition presentations to the directly affected communities, the availability of hardcopy reports and translated summaries at public libraries serving the areas where stakeholders are located, postings on the web site, newspaper advertorials and direct e-mail messages to the entire stakeholder group.

#### *6.6.2.3 Personal Contact*

Personal contact of the manager of the process with the media normally also creates an environment where the media and other stakeholders have the freedom to make contact with the team to get news releases or to confirm facts about the assessment. The manager of the stakeholder participation process will arrange initial meetings with the local papers and agree on a methodology to release news about the assessment and to ensure that accurate information is published, especially when this may come from other sources which may have pre-determined agendas.

#### *6.6.2.4 Pro-active communication*

Poor communication from the ESHIA Team may lead to the media scouting for news at the wrong places and it is necessary for the team to keep the media informed all the time. In this way they would have adequate and accurate information available for publication which will contribute to more effective dissemination of information and news about the assessment. Regular press releases will be issued by the PJTC to ensure that the public is kept up to date with progress on the assessment.

#### *6.6.2.5 Effective Reporting*

Effective reporting forms the basis of keeping all stakeholders and the public informed about participation events and the results of these. To ensure effective reporting, the public participation manager will make all minutes of stakeholder engagement events available to the public and stakeholders through the various methods as described under 6.1.5.2 (r). In the case of Angola, existing discussions forums will also be of use to support the reporting.

## 6.7 PARTICIPATION IN MANAGEMENT AND MONITORING

### 6.7.1 Objectives

If the proposed project proceeds to implementation, it is important to ensure that stakeholders and especially the directly affected communities and their representatives be afforded a role in managing the implementation process and in monitoring the performance of the project during operation. The objective of this element is to ensure that, should the project proceed, these stakeholders have a means to monitor and report on performance as far as the implementation of mitigation and enhancement measures are concerned. Affected communities should also be in a position to monitor whether the Project Proponent, its contractors and staff keep to the provisions of the ESMP which will result from this assessment.

### 6.7.2 Methodology

#### *6.7.2.1 Management and Monitoring committee*

Towards the end of Phase Two of this assessment, the ESHIA team will negotiate with stakeholders to set up a management and monitoring committee. This committee will mainly consist of members recruited from the directly affected communities, from expert groups and from other stakeholders that are best placed to serve on this committee. The role of the committee will simply be to guard over the effective implementation of all agreements reached through the course of the assessment and to ensure that the rights of stakeholders, especially the directed affected parties are indeed protected as agreed.

# 7 INITIAL STAKEHOLDER ENGAGEMENT PLAN AND PROGRAMME FOR PHASE 1

As stated before, various stakeholder groups have different concerns and different issues are likely to be of concern for each of the stakeholder groups. In addition to this, different methods are required to reach these various stakeholder groups and communicate with them effectively. This section provides a brief outline of the methods that will be used during phase one to reach the various stakeholder groups, as well as a programme of stakeholder engagement for the scoping phase of the assessment. Through the course of phase one, the PCDP will be elaborated to serve as the PCDP for Phase 2.

## 7.1 METHODOLOGIES TO ENSURE PARTICIPATION OF VARIOUS STAKEHOLDER GROUPS

### 7.1.1 Local communities

These communities reside in the project area and have particular requirements to ensure effective participation. Methods to be used to reach them include:

- Meetings with traditional leaders to prepare the communities for the assessment.
- Public meetings held at the main villages in the Epupa Constituency and at Iona Communal Administration to which all community members are specifically invited.
- Exhibitions of visual material before public meetings or on a permanent basis.
- Messages over the language radio about issues and events and the Community Messenger of the Tombwa Administration.
- Face to face discussions, including surveys of opinions.
- Translation of key reports into the local vernacular and
- Dissemination of non technical reports and brochures to local libraries, schools, markets, churches, public institutions and the traditional leaders in the area.

### 7.1.2 Community Based Organisations (CBOs)

A number of community based organisations such as conservancies, and development organisations exist in the project area. They require slightly different methods of engagement and the following methods will be used:

- Public meetings held at the main centres of Opuwo and Namibe.
- Public meetings held at the main villages in the Epupa Constituency and the Iona Communal Administration.
- Press releases to high circulation newspapers in the area.
- Media releases over local radio stations.
- Posting of information on the project web site.
- Direct e-mails to those that have access to e-mail
- Dissemination of non-technical reports and brochures to local libraries, schools, markets, churches, public institutions and the traditional leaders in the area.

### 7.1.3 Population of Namibia and Angola

Methods to notify and involve the public will include:

- Press releases to high circulation newspapers.

- Media interviews on local radio stations.
- Posting of information on the project web site.
- Dissemination of reports and brochures to local libraries and schools in the area.

### 7.1.4 Local and National Non-Governmental Organisations

The same strategy as for local CBOs will be followed to engage local NGOs namely:

- Public meetings held at the main centres of Opuwo and Namibe.
- Public meetings held at the main villages in the Epupa Constituency and at the Iona Communal Administration.
- Press releases to high circulation newspapers in the area.
- Media releases over local radio stations.
- Posting of information on the project web site.
- Direct e-mails to those that have access to e-mail
- Dissemination of non technical reports and brochures to local libraries and schools in the area.

### 7.1.5 International Organisations, Academic and Research Institutions and Individual experts who contributed to the Epupa debate during the previous assessment.

The previous study has proved to attract considerable attention from international organisations (inclusive of non-governmental organisations), academic and research institutions and individual specialists. These are generally sophisticated and electronic means can be used to involve and communicate with them. Methods to be employed will be:

- Posting information on the project web-site and keeping it up to date.
- Direct e-mails to contact persons within such organisations, especially those that have been involved in or has been critical to the previous assessment

### 7.1.6 The Governments of Namibia and Angola and its various ministries and Project Partners

The ESHIA team has a contractual responsibility to keep these stakeholder groups informed about all aspects of this project. The most direct link of the ESHIA team will be with the PJTC through the Baynes committee. Baynes Committee members will largely form part of all consultation and participation events in Phase One and will, on the basis of accurate minutes of these events, report to the PJTC, who will in turn report to the Ministry of Mines and Energy in Namibia and the Ministry of Energy and Water in Angola. The project partners, which for now are limited to the Techno-Economic Consultant, will be kept up to date through regular liaison meetings between the two teams aimed at ensuring proper coordination of the environmental, social and technical work being undertaken at a given time. Line ministries will be separately recorded as stakeholders and will be involved through

- Public meetings held in Windhoek, Luanda, Tombwa and Opuwo.
- Posting information on the project web-site and keeping it up to date.
- Direct e-mails to contact persons within such organisations, especially those that have been involved in or have been critical to the previous assessment.

## 7.2 PROGRAMME FOR ENGAGEMENT OF STAKEHOLDERS.

The programme overleaf provides a preliminary schedule for stakeholder engagement during the first phase of the assessment.

**Table 2: Stakeholder Engagement Programme for the Baynes ESHIA**

| Activity | Dates | Description/attendants |
|---|---|---|
| **Phase 1: Scoping Phase** | | |
| **1. Gaining Access to the Communities** | | |
| Briefing of RC/Angolan Local Authorities | 6 February to 31 March 2009 | Initial briefing of the regional/local authorities about the proposed project and requests for assistance/advice. |
| Briefing of the Namibe Provincial Council | 17 April – 18 April 2009 | Initial briefing of the regional/local authorities about the proposed project and requests for assistance/advice. |
| BID finalisation | 30 April 2009 | Finalise all outstanding issues on the BID inclusive of visual aides to effectively disseminate information to the public and DAPs |
| PCDP consultative meeting with Directly affected parties | 10 – 20 May 2009 | Meeting with chiefs and headman of both countries to discuss and agree on the PCDP, disseminate information about the project, discuss their initial concerns and negotiate access for the entire team. This will take place at Epupa and/or Okangwati in Namibia |
| **2. Scoping** | | |
| Public Scoping Meetings in Windhoek and Luanda | 2 June (Windhoek)<br>29 June (Luanda) | Town hall meetings with all external stakeholders and directly affected reps if possible. |
| Local Scoping meetings at Opuwo and Tombwa | 15 – 16 June | Meetings with regional stakeholders in the regions affected by the proposed project. |
| Final Scoping Meetings with Directly Affected communities. | 24 – 27 June | Meetings with the Himba Groups from both Namibia and Angola on the perceived impacts of the proposed projects on them. Confirmation of scoping issues identified thus far. Meetings will be at Epupa in Namibia and at Iona in Angola |
| **Phase 2: Impact Assessment and Mitigation Development** | | |

| | | |
|---|---|---|
| **1. Phase 1 Feedback** | | |
| Public feedback meetings with DAPs | Mid September | Feedback to DAP's about the findings of the scoping phase and sharing the TOR for the second phase of the ESHIA. |
| **2. Community Verification and Mitigation Options Workshop** | | |
| Continuous contact with the traditional leaders during fieldwork. | Continuous | Community liaison officer to keep the traditional leadership informed about all aspects of fieldwork |
| Mitigation alternatives workshop with directly affected communities | Mid March 2010 | Provide feedback to the community on the findings of the various studies, present the key impact and mitigation alternatives. Workshop the acceptability of these alternative and agree |
| **3. Community Feedback and Approval Meetings** | | |
| Community Feedback Meeting | Mid April 2010 | Present the ESHIA, Mitigation measure and resettlement action plan to the community for comment and amendment. Obtain community approval. |

# 8 COMPLAINTS AND GRIEVANCE PROCEDURE

A grievance procedure is normally required during implementation and operation of a project to ensure compliance with environmental and social performance standards. Aggrieved stakeholders who feel that their opinions have not been duly considered, that they have not been afforded adequate opportunity to participate in the scoping process, or that the provisions or undertakings in the PCDP have not been followed, must have recourse to a body which can assess such a complaint and address it effectively.

To facilitate this, the ESHIA team agreed on the following with the Traditional Leadership in the Kunene Region. The proponent and the ESHIA team will set up a grievance committee which will deal with all grievances received from any stakeholder. The grievance committee will consist of one representative each from the Ministry of Mines and Energy, Nampower and the Kunene Regional Council, three representatives from the local community and a legal person. The ESHIA team will also appoint a grievance officer who will be responsible to receive all grievances and institute the necessary action to deal with them. The committee will be obliged to meet when there are complaints and to deal with these swiftly and effectively. Stakeholders will always be given the benefit of the doubt when considering complaints and the ESHIA team will institute all reasonable actions required to remedy the situation should the complaint be fair and valid.

The grievance officer will also act as the secretary to the Grievance Committee. The grievance officer will design a grievance recording form. This form will be available on the ESHIA web site and will also be brought under the attention of all stakeholders. Such forms will also be provided to the local leadership for use if and when necessary.

Should a grievance arise, it was agreed with the traditional leaders that the following procedure be followed:

Any grievance will first be addressed to the liaison officer who will take it up with the manager of the public participation process (PPM). If the PPM is unable to deal with the grievance, it will then be channelled to the grievance officer who will record the grievance on the prescribed grievance forms and prepare a report on the grievance. This will then be tabled at a meeting of the grievance committee who will consider the case and

make a ruling as to how this should be addressed. This ruling will then be forwarded to the PPM to give effect thereto.

Annex B

# Records of Consultation Materials

| | |
|---|---|
| Subject/Ref | Baynes Hydropower ESHIA |
| Venue | Namibe city, province of Namibe |
| Date of Meeting | April 17th |

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The Permanent Joint Technical Commission on the Cunene River Basin (PJTC) in joint efforts with the Angola Research Institute (A-IP) held a meeting with the Namibe Governor and its staff, with the main objective to provide an overview of the Baynes Hydropower project as well as to present a road map of the ESIA. The meeting took place on April 17th in the city of Namibe and gathered nine participants (see list of participants).

The first part facilitated by Mr Mendes from the PJTC, provided the participants with background information of the Baynes Hydropower project as well as highlighted the role played by the Angolan Government and the PJTC in particular to date (see presentation).

The second part facilitated by H Ducados from the A-IP introduced the ESIA process and explained the steps involved in the implementation of a Public Consultation Development Plan (PCDP). The presentation also highlighted the stakeholders engagement needed to ensure the success of the PCDP at the different levels (see presentation).

Given the need to gather opinions from the Provincial Government to help prepare the implementation arrangements for the PCDP, the following issues were raised by H Ducados:

1. What would be a suitable location to hold the public consultation at the communal level in the area of the project;
2. Is it possible for the project to use the Tombwa Administration communication devices to contact the traditional leaderships (Himbas) and the population in general;
3. Is it possible to use a focal point identified by the Municipal Administration of Tombwa to represent the traditional leadership (Himba);
4. Is it possible to treat the Himbas as one group (Angola/Namibia).

- The Governor suggested that the Iona communal administration has a suitable room where public consultation could be held. In addition the Baptist Mission has also a room that the project could use;

- Communication devices (messenger) in use by the Tombwa Administration to communicate with traditional leadership could also be used by the project;

- The Municipal Administrator will be in charge of identifying a focal point to represent the traditional leadership in all project matters;

- Local government in collaboration with the project has to investigate whether the Himbas form both countries could be treated as one group and/or if the Himbas are as indicated represented on the Namibian side.

In turn the participants raised the following concerns:

| Issues raised | By whom |
|---|---|
| 1. Considering that the project area covers a natural reserve, what would be the precaution that the project will use to ensure that the access to the project will not be to the detriment of the natural reserve | Director of Fisheries |
| 2. What would be the use of the used water, what would be the gains for agriculture | Director of Agriculture |
| 3. What would be the gains of the project for the province in terms of social services | Director of Public Works |
| 4. Why the public consultation is first taking place in Luanda and not in Tombwa Municipality and in the area of the project in particular | Director of Planning |
| 5. What would be the compensation of the population in case of forced displacement | Director of Environment and Territorial Planning |
| 6. It will make sense for the Provincial Government nominates a focal point at provincial level to follow/monitor the project activities | Provincial Governor |

The Governor thanked the participants and suggested that further correspondences should from now on, be addressed to the Vice Governor in charge of social issues, Dr. Antonio Correia 923631747 as he will coordinate with the project the organisation of the public consultation at the provincial, municipal and communal levels.

The facilitators thanked in turn the Governor and its staff for their participation and kindness. It was agreed that the agenda for the implementation of the public consultation will be shared with the Cabinet of the Vice Governor so as to prepare jointly the logistics arrangements.

| List of participants | Contact |
|---|---|
| 1.Álvaro Manuel de Boavida Neto- Governador | 923401021 |
| 2.Francisco Munans- Planning Director | 923 491015 |
| 3.Isaac Cativa Herculano- Fisheries Director | 921499238 |
| 4.Gabriel Faustino Félix – Agriculture Director | 923579964 |
| 5.Carlos de Sá - Public Works Director | 923 581290 |
| 6.António A Mitendo- Territorial, Housing and Environment Director | 92348 9321 |
| 7.Carla Eduardo- Provincial Government | 924815932 |
| 8.Henda Ducados- A-IP | 923605046 |
| 9. Carolino Manuel Mendes Gabinete p/Administração da Bacia | 923406388 |

# *MINUTES OF CENTRAL LEVEL PUBLIC CONSULTATION MEETING FOR THE BAYNES HYDROPOWER PROJECT HELD IN THE SAFARI CONFERENCE HALL ON 2ND JUNE 2009*

## ATTENDANCE

| NAME | COMPANY / POSITION |
|---|---|
| Mr. Joseph Iita | MME |
| Mr. Daniel Zaire | MME |
| Mr. John Langford | NAMPOWER |
| Mr. Basil Dax | NAMPOWER |
| Mr. Pedro Maritz | Baynes Committee |
| Mr. Peter Tarr | SAEIA |
| Ms. Stephanie van Zyl | Enviro Dynamics |
| Mr. Ernst Simon | Urban Dynamics Africa |
| Mr. Johan de Kock | Urban Dynamics Africa |
| Mr. Uarije Karipetua | Himba Liaison Officer and Translator |
| Mr. Eamonn Barret | ERM |
| Mr. Mike Everett | ERM |
| 5 Observers | Himba Community |

Various stakeholders from the public and private sector and the media. (Attendance list is available on request)

## 1. OPENING AND WELCOME

Mr. Iita welcomed all the attendants to the meeting. He stated that the Namibian government is respectful of the views and aspirations of its people and this is proved by the public consultation process to be followed during the Environmental and Social Impact Assessment for the Baynes Hydropower project. He then introduced the representatives from the Kunene Region.

Mr. Iita proceeded to introduce the team who was entrusted with ensuring that the consultation process process was inclusive and successful in seeking stakeholder opinions to help with solving the energy problem of the greater SADC region. The meeting was then opened the floor handed over to Mr. Simon to continue with the presentation.

## 2. INTRODUCTION AND PURPOSE OF MEETING

Mr. Simon thanked the chairperson, and made a few special arrangements before the presentation. He asked that a chance be given for Mr. Karipetua to translate the discussions to the Himba observers

present and requested that anyone who wish to speak use the roaming microphone in order for the discussion to be recorded on camera. Mr. Langford also requested that participants first introduce themselves before speaking.

The purpose of the meeting was then elaborated as:

- To provide an overview of the ESIA process,
- Elaborate the technical background to the project,
- To share potential social and environmental impacts,
- To provide an opportunity for I&APs to add to the list of potential impacts to be included in the study,
- To provide an open forum for discussion, and
- To consider the way forward.

## 3. PRESENTATION OVERVIEW

The meeting was structured in the following manner:

- Review of the ESIA process by Ms. van Zyl;
- The need for and technical aspects of the proposed project by Mr. Langford;
- Project background and potential bio-physical impacts by Mr. Everett;
- Potential social, cultural and economic impacts by Mr. Simon
- Card writing exercise –identification of additional impacts/issues by the team.
- Card sorting and issues summary by Messrs. Simon and Everett
- Open discussion facilitated by Mr. Simon
- Conclusion and closure by Mr. Barrett

The various presentations were given with an opportunity for questions and discussion after each presentation.

## 4. QUESTIONS AND ISSUES RAISED DURING THE PRESENTATION

Following the presentation of Mr Langford, the following issues/questions related to the technical aspects of the project were raised.

- Mr. Wolfgang Schenk, on behalf of News posed the following questions: (1) In calculating the growth in peak demand for electricity in Namibia, one reason for the increase offered was the growth in the uranium mining activities. He wanted to know why so much is done to satisfy the demand while the potential mines have a lifespan of 20 years. Are there not other alternatives and responsibility from the mines themselves? (2) He further wanted to know, since it was stated that the Epupa site is not considered “this time”, if it will resurface later and investigated again at a later stage? (3) He also stated that previous studies indicated that the pure water mass may influence the geological and hydro geological conditions, not only in the catchment area but even further afield and wanted to know if any research, simulations and calculations to this end have been conducted?

Mr. Langford responded that (1) all are surprised at the number of new mines under development and that the new mines are a huge source of income for this country. His opinion was that this is the resources that our country is endowed with, which should be developed and managed. (2) Up to the 580m contour site at Epupa would become inundated should be built. He could not speak for future generations but conditions might change and then it may be possible, but for our generation, no, Epupa would not be developed. (3) This forms part of the environmental studies and the geological investigation that would be conducted. One definitely needs to assess where any fault lines are and this is definitely a field that would be carefully researched. Mr. Langford handed over the microphone to Mr. Barret who summarised the issue. He explained that issues related to the influence of large water bodies on hydro-geology were normally considered as part of the scope of environmental impacts such as the one we're carrying out. The techno-economic consultant would need to understand any geological issues just in terms of the viability of the dam and the potential for leakage that may impact on the power generation capacity of the dam. One issue of internationally accepted ESIA standards which is part of this study is dam safety with a designated safety expert, accredited by the World Bank, forming part of our team.

- Dr Mary Seely asked (1) why good sites between Callueque and Epupa were considered but then just skipped. She wanted to know if these sites were still on the table or not, and (2) she requested clarification on why the three sites could inundate the same area upstream from the first proposed dam site. Was it because of different dam wall heights?

  Mr. Langford responded that (1) the Epupa and Baynes sites were identified as the most economically feasible sites during the previous study that was conducted. The sites between Epupa and Callueque do not have sufficient storage capacities and would depend on storage upstream to be viable. (2) For each of the dam sites we looked at three possible levels, the 580 level that was shown on the map is a worst case scenario; the other levels that were looked at are the 560 and the 540 meter contour levels. This would mean that the height of the wall relative to the river at the downstream site would be higher than at the original or the upstream sites to reach the 580 height. It would therefore have a higher head and more generation capacity.

- Mr. Harold Schutt, a private consultant, asked (1) if the control of the water flow, as he understands it, is dependant on the Gove Dam, what if the Angolans decide to irrigate between the Gove Dam and Epupa, and the water eventually only trickles? (2) Another concern was regarding the technical design, as it was understood that with the construction of a hydropower station it could also take into consideration the potential usage for a pump storage scheme. (3) He stated that the cost issue was of course the crucial one and asked what the kilowatt hour price will be compared to other renewable energy sources and other technologies still to come? (4) He remarked that the 40 Megawatt generation stated in the presentation for the renewable energy is far too low in considering new technologies compared to the Baynes Hydropower generation capacity. (5) He further wanted to know if the team is aware of the biomass that will be inundated and when it rots, would release green house gasses?

  Mr. Langford (1) agreed that the fuel of the power station is indeed the control of water and this was part of our studies. The bilateral agreements between Namibia and Angola are crucial

towards the success of the Baynes Project. It must be understood that 70% of the Kunene river flow occurs downstream from the Gove Dam. Scenario 2 from the previous study also defined the upstream extraction figures from the Gove Dam. The different abstraction figures would form part of this study and be contained within the bilateral agreement. (2) He stated that, at present, we attempt to assess the viability of a hydropower project. The efficiency of a pump storage scheme is lower and one could only get about 70% of the energy put into the scheme. Ideally, pump water schemes are utilised at peak times, usually at night where cheap power is used for pumping while energy is cheap, to produce energy during the peak demand periods. It would make this project unaffordable should a pump water storage scheme be considered part of the project. (3) At this stage it was too early to say what the Kilowatt hour cost would be but of course the acceptable Kilowatt hour cost would be compared with the other options that were mentioned in the presentation. We shall have to calculate the Kilowatt hour cost for comparison with the other energy options. (4) This was considered to have merit, but our main consideration was in the generation of grid energy in large quantities. There are various people that are augmenting supply but the 40 odd Megawatt supply estimate is most probably all that can realistically be integrated into our grid. As was mentioned before, the cost of renewable energy is still much higher than the cost of conventional energy. Anyone who disagrees must feel free to prove this notion. In the end, it was the consumer that had to pay so it was an issue of affordability. (4) Mr. Everett referred this question to the section on the potential bio-physical impacts of the dam in the presentation. Mr. Langford commented that the team was fully aware of the methane emission impacts; however, his belief was that the Baynes area represents some of the least vegetated areas in the world.

- Ms. Brigitte Weidlich from the Namibian newspaper asked (1) what the maximum length of the dam at Baynes would be; (2) whether this means that it will extended to only a few meters from the Epupa waterfall? (3) She also wanted to know if there will be a 50/50 share between Namibia and Angola with regards to electricity? (4) She further asked Mr. Langford to please say something about infrastructure requirements, like power lines, access roads etc., and (5) asked if it would happen again like at Epupa where the consortium team constructed a camp which was later converted into a tourism camp. (6) Finally, she request what the estimated cost for the construction of the Hydropower Scheme was?

  Mr. Langford responded (1) that the length would be approximately 40-45 kilometres, (2) that it would reach the foot of the Epupa waterfall if we developed it up to the 580 meter level, and (3) that power will be shared equally between the two countries. (4) For the previous study a roll-on compacted dam wall was considered which required importing a huge amount of cement (30 truckloads of cement daily and continuously) which further meant construction of an access road from Namibe, which is the nearest port. Suffice to say that the development of infrastructure to the power station would require a completely different ESIA study, especially for the power lines. Another proposal under investigation is to integrate the two systems by constructing one power line connected to the grid on both sides. Infrastructure used for the construction of the dam must be carefully planned for example, excavations and quarries would occur within the dam inundation area so as to be under water eventually. There would therefore be permanent interaction between the technical and environmental teams during the entire process to assess and minimise impacts of the dam design. (5) Regarding the camp, Mr. Langford could only comment that someone took an opportunity to use it for tourism. (6) It was

difficult to say at that point in time what the actual cost of the dam would be, but in the previous study the preferred option of the Baynes Dam was in the order of 800 million US Dollars. It appeared closer to a billion US Dollars to Mr. Langford now but only the study could show what the actual costs would be.

- Mr. Andrew Corbett, the legal representative of the affected community inquired (1) about the different options and why these options seem to be discounted in favour of the Baynes site and, (2) where the operating infrastructure would be located.

  Mr. Langford responded that (1) the problem with the downstream options like the Marienfluss site was that it is much further away with tremendous mountain obstacles in its path from integration into our existing infrastructure. Mr. Maritz agreed that the previous studies confirmed the Epupa and Baynes sites, from a technical perspective and an environmental view, as far superior to the other alternatives. (2) Mr. Langford replied that the situation of the operational infrastructure like the power station depended on the dam site and cost. It would have been ideal to have a power station on both the Namibian and Angolan sides; however, this was found to be economically not feasible. So it was impossible to say on which side the operational infrastructure, including the power line, could be situated and this had to be negotiated between the two countries.

On the social, cultural and economic aspects of the project the following questions/issues were raised during the presentation:

- Ms. Weidlich from the Namibian asked Mr. Simon (1) to clarify the potential 8000 people that may live at the site during construction and, (2) nobody had clarified the plans to build a port at Cape Fria and the railway line.

  Mr. Simon responded (1) that from the literature and previous study the 2000-3000 workers contracted to work on the dam normally is likely to attract family members and therefore the actual figure is more in the line of 8000 people resident at the site. This was an estimate and he supposed there was also means to control this figure. On the second (2) question Mr. Simon requested if anyone had any comments on Cape Fria stating that as far as he knew, it had no relation to Baynes. No-one responded.

## 5. QUESTIONS AND ISSUES RAISED DURING CARD-SORTING EXERCISE

Cards were distributed after the presentation and the participants were requested to put in writing all their environmental issues on the green cards and the social issues on the yellow cards. Afterwards all the issues were sorted according to categories on the flipcharts and Mr. Simon and Mr. Barret then gave feedback on the issues/concerns back to the participants. The following table represents the issues that were raised during the card writing exercise:

| Issue | Stakeholder concerns and questions |
|---|---|
| **Demand Management** | What about the inclusion of energy efficiency countrywide (solar water heating can save 80MW of peak time)?<br><br>Is energy demand management considered? |
| **Time and Cost** | With the construction costs ever increasing, we need be mindful of further delay as Namibia need both the water and electricity already. |
| **Elite Capture** | At the end of construction does it mean that the favourite few would be allowed to buy (obtain) lakeside properties?<br><br>Any ideas to prevent this. |
| **Local Concerns** | Loss of "sense of place" i.e. dam, roads, power line and related industries will change Kaoko.<br><br>Local concerns will be swallowed by national and SADC needs. |
| **Pumping** | For Namibia to benefit from the water why is serious pumping not part of the feasibility study? |
| **Dam Safety** | With the filling of the dam, the pressure of the weight of the water on the land. Is this considered, with possible shifts, earthquakes? |
| **The Right Option** | How can you know that such large centralised generation solution is economically viable?<br><br>How many MW can be generated for the same money if Namibia invests in Energy Efficiency and Decentralised Renewable Energy generation?<br><br>With so much uranium available why not also compare a nuclear power station as an alternative?<br><br>Rehabilitate Calueque. |
| **Contract Workers** | Will workers and construction village go afterwards? |
| **Secondary Impacts** | The opening of Kaoko (roads and power) may spark new mining rush in the area, ravine and Cape Fria Project. |
| **Ecology** | Impact of pulses on downstream ecology.<br><br>Length of time for dam to fill up.<br><br>Sensitive ecology of Kunene River mouth.<br><br>Danger of introducing alien fish production that could ruin indigenous species. |

| | |
|---|---|
| **Management and Monitoring** | Does monitoring and implementation capacity exist for ESIA Plan?<br><br>Many good ideas but who monitors and enforces?<br><br>Climate impact costs: cement manufacture, transport, greenhouse gas emissions, up and downstream sediments and deforestation.<br><br>Efforts to achieve trans-boundary conservation may be undermined. |

## 6. FINAL REMARKS AND CLOSURE

In closure, Mr. Barrett expressed his hope that it was clearly understood that we are at the start of the process and a very important part of that process is the involvement of stakeholders. He thanked the Permanent Secretary for his attendance and kind opening words. He thanked all for their contribution and suggestions in this meeting, and hoped for similar contributions from the meetings to follow for the rest of this month.

***MINUTES OF REGIONAL LEVEL PUBLIC CONSULTATION MEETING FOR THE BAYNES HYDROPOWER PROJECT HELD IN THE MINISTRY OF GENDER AND EQUALITY HALL ON 15th JUNE 2009***

## ATTENDANCE

| NAME | COMPANY / POSITION |
|---|---|
| Mr. Daniel Zaire | MME Deputy Director |
| Mr. Murore | Kunene Regional Councillor |
| Mr. John Langford | NAMPOWER |
| Mr. Basil Dax | NAMPOWER |
| Ms. Stephanie van Zyl | Enviro Dynamics |
| Mr. Ernst Simon | Urban Dynamics Africa |
| Mr. Karipetua Uarije | Himba Liaison Officer and Translator |

Himba Community, Government officials and representatives of the private sector, and Opuwo local residents. (Attendance list is available on request)

## 1. OPENING AND WELCOME

The Regional Councillor for the Epupa Constituency, Hon. Mberura Kasita, welcomed all present at the meeting and officially opened the meeting. Mr. Simon then introduced the Deputy Director of the MME, Mr. Zaire, who addressed the meeting and opened it on behalf of the team. The floor was then handed to Mr. Simon to proceed with the presentations.

## 2. INTRODUCTION AND PURPOSE OF MEETING

The Deputy Director offered to do the translation into Otjiherero for the public meeting. Mr. Simon laid down some house rules. It was arranged that, there would be a break halfway through the meeting; secondly, everyone was requested to record their names in the attendance register and, lastly, it was agreed that no one was allowed to speak unless they had the microphone in their hands. The Background Information Document was also made available to participants.

Mr. Simon explained that the team could not sit in Windhoek and think up ideas by themselves. This was part of the reason why this meeting was held, namely to enable the local community to identify additional issues that might not have been identified yet. We agreed to proceed with the project step by step and the meeting was like taking a second step following the first meetings with the Chiefs and councillors and the Regional Council. After the meeting there still was a number of steps remaining after which the point can be reached where an informed decision can be made by all stakeholders together with the team.

The purpose of the meeting was then elaborated as:

- To provide an overview of the ESIA process,
- Elaborate the technical background to the project,
- To share potential social and environmental impacts,

- To provide an opportunity for I&APs to add to the list of potential impacts to be included in the study,
- To provide an open forum for discussion, and
- To consider the way forward.

## 3. PRESENTATION OVERVIEW

The structure of the presentation for the meeting was specified by Mr. Simon to be as follows:

- Review of the ESIA process by Ms. van Zyl;
- The need for and technical aspects of the proposed project by Mr. Langford;
- Project background and potential bio-physical impacts by Ms. van Zyl;
- Potential social, cultural and economic impacts by Mr. Simon
- Card writing exercise –identification of additional impacts/issues by the team
- Card sorting and issues summary by Mr. Simon
- Open discussion facilitated by Mr. Simon
- Conclusion and closure by Mr. Simon

The various presentations were given with an opportunity for questions and discussion after each presentation.

## 4. QUESTIONS AND ISSUES IDENTIFIED FROM MEETING

A number of questions arose from the discussion:

- Will the meetings all be similar?
  **Mr. Simon answered in the affirmative that the structure of the meeting is exactly the same as the meeting in Windhoek.**
- Are the benefits the same on both sides of the border?
  **Mr. Langford answered in the affirmative. What might happen was that the operating village could be constructed on one side.**
- Will all the water be dammed up or will it still reach the Marienfluss?
  **Mr. Langford responded that the dam would retain water but that some water will always be let through the wall to ensure that the river system is not damaged. About half of the water flow would be needed to fill up the dam. Once the dam is full, water that flow into the dam on the one side would be released on the other side.**
- If the dam is built will most of the water fill up to the Epupa waterfalls? The participant stated he did not know how big the dam will be.
  **Mr. Simon responded that at Epupa itself it would be just as wide as the river is now and as it goes further down it gets wider. We also thought of building a model of the dam to show people in the next phase how big the dam is going to be or to use other methods to help people to understand clearly.**

## 5. QUESTIONS AND ISSUES IDENTIFIED FROM CARD SORTING EXERCISE

Mr. Simon informed the participants that he, Mr. Karipetua and representatives of Chief Kapika visited the Orokawe site previously and the correct positioning of local villages and important names and places were identified to be correctly mapped to help with a better understanding of the area by all.

Green and yellow cards were distributed to each participant at the meeting. The participants were requested by Mr. Simon to write down all the environmental issues on the green cards and the social issues on the yellow cards. Mr. Simon further explained that similar meetings were to be held on the local, and national levels and that all the issues identified were then to be reported back to them.

The following issues were identified from the cards

| Issue | Stakeholder concerns and questions |
|---|---|
| **Socio-Cultural** | **Negative responses:** |
| | Cultural deterioration of custom, belief and language through outside influences and manners. |
| | Graves will have to be moved which is against Himba culture. |
| | 2000-3000 workers will be foreigners therefore no job creation in community. |
| | During construction of the dam and after completion of the project, too many people will be attracted to the area and overpopulation will result. |
| | Pastoral system will be lost. |
| | The leadership of the Himba people will be challenged. |
| | The dam creates fear amongst the people. |
| | Land claims – people will be moved from areas inhabited by forefathers for centuries, places they identify themselves with and where strong cultural ties exist |
| | Himba will not benefit because they are livestock herders. |
| | **Positive responses:** |
| | Improved service provision – educational and medical facilities |
| | Minority cannot develop Namibia, but majority can. |
| | Himba can learn to live with many other people. |
| **Modern Services** | Communication will improve with construction of roads and telecommunication infrastructure. |
| **Land and Ownership** | **Negative responses:** |
| | Pastoral land will be captured by foreigners. |
| | Conservancies will suffer if natural resource is damaged. |
| | Loss of control over land and resources. |

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|---|---|
| | Loss of homesteads, gardens, grazing field and bee hives. |
| | Damage of natural beauty and sense of place |
| | Emergency grazing fields for drought years will be affected. |
| | Doubts whether local Himba community will be compensated. |
| | No more settlement, urban living directly lead to cultural loss. |
| | Government will take away my rights as a human being. |
| | People will be displaced. |
| | **Positive responses:** |
| | Kunene is big area, people not confined to movement near dam site. |
| **Health** | More disease like HIV/Aids, cholera and malaria. |
| | Dam and road safety to people and free roaming livestock. |
| **Social Pathologies** | Murder, crime and theft of livestock |
| | Begging |
| | Alcohol and drug abuse. |
| | Prostitution and rape. |
| **Economic** | **Negative responses:** |
| | Require elite capture mitigating conditions. |
| | Destruction of natural resources. |
| | What about Ruacana electricity? |
| | More business opportunities will be created like shops. |
| | Do not want to buy water we are currently using. |
| | Steps must be taken to ensure that short-term growth can be sustained in Opuwo especially after construction phase. |
| | Damage to tourism and natural resource. |
| | Loss of land, pastures and indigenous foods and fruit trees. |
| | Don't want foreign trade. |
| | People will buy on credit which can result in a loss for our people. |
| | The price of cattle will decrease. |
| | Shanty towns will grow (Informal settlement proliferation) |
| | Small local shops will loose out to larger businesses. |
| | **Positive responses:** |
| | Bring more development sectors too people left behind– economic diversification |
| | We need the water and electricity in the region. |
| | The power will help to stop national crisis of the economy. |

| | |
|---|---|
| | The dam will stimulate other developments in towns.<br>Some employment opportunities will be created and the community will gain valuable experience.<br>Development in our region is invited.<br>Electricity is already too expensive.<br>Dam can attract more tourists into the area and thereby stimulate local economic growth.<br>Community empowerment. |
| **New Water Environment** | The dam will negatively impact on the Kunene River. |
| **Downstream Effects** | Short-term impacts during inundation ("first filling").<br>Long-term impacts on river levels during operation. |
| **Groundwater and Water Resources** | The dam might cause underground water to recharge more slowly. |
| **Pollution** | There will be increased levels of sound pollution.<br>Water pollution will result from machines (oil spillage from motorboats)<br>Environmental pollution will result from waste products.<br>Industry and related activities will pollute environmental. |
| **Aquatic Ecology** | The indigenous water species, like fish and crocodiles, will be lost to lots of water |
| **Terrestrial habitats** | **Negative responses:**<br>Historical mountains will disappear, unique landscape will be degraded.<br>Loss of vegetation.<br>Too much water will stunt growth of trees, in particular, palm trees will be lost and take too long, if ever, too recover.<br>Look at our Forest Department because trees are very important to community.<br>Organisms that live in soil will die due to soil erosion.<br>Fear of deforestation like seen in the Northeast.<br>**Positive responses:**<br>Dam will not cause harm to environment.<br>Deforestation and increasing desertification. |
| **Wildlife** | Animal migration will be affected.<br>Disturbance of wildlife. |
| **International** | Destruction of trees very worrying because it creates air that people breath – Global warming |

Mr. Simon informed the participants that since so many cards were received, he could not display the cards on the board and therefore proposed to rather try and quickly give them some idea of the issues that were identified by the participants in the meeting for discussion purposes.

On the social side the following issues were raised:

- On the social side the issues ranged from “please build the dam” to “don’t build the dam”;
- A lot of cards dealt with employment;
- There were many cards expressing concern about the impact of the dam on the Himba tradition;
- Some of the cards said that development was needed such as education;
- Many people were worried about the issue of HIV-Aids;
- People seemed to be afraid of the effects of elite capture;
- Quite a number of cards said that our people will become beggars at the hands of the elite;
- People were worried that pastures would be captured by newcomers;
- A concern was livestock and theft;
- There was a number of cards that basically said that foreign influence is unwanted;
- Impacts and compensation was another issue raised, one card stated compensation by bulls.

On the environmental side the following issues were raised:

- An important issue that were identified was that the destruction of vegetation was dangerous because people breathe trees;
- Water availability and pollution was another concern.

Mr. Simon reiterated that the key issues identified during all the meetings were to be summarised and reported back during a follow-up meeting.

Some of the cards were written in Otjiherero and Mr. Karipetua was instructed to translate these and give them to Mr. Simon afterwards.

A number of the Councillors also requested that they first see the site before they could comment. Mr. Simon agreed that arrangements for this could be made.

The issue of compensation was discussed. The author of the card stating “compensation by bull” wished to clarify his statement. He elaborated on the idea stating that the benefits from the project would be minimal for the Himba. He therefore made the proposal for compensation as there were many who cannot be employed in the project but should be compensated in one or the other way. Mr. Simon responded that in principle everyone must be either at the same level or better-off after compensation and that was a future matter.

## 6. FINAL REMARKS AND CLOSURE

Mr. Simon reminded the participants that the period for any additional commentary would be over by the end of June, and the scoping report available by the end of July or early August. Mr. Zaire then closed the meeting in Otjiherero.

# *MINUTES OF LOCAL LEVEL PUBLIC CONSULTATION MEETING FOR THE BAYNES HYDROPOWER PROJECT HELD AT EPUPA FROM THE 26TH-27TH JUNE 2009*

## ATTENDANCE

| NAME | COMPANY / POSITION |
|---|---|
| Hon. Murorua | Governor of Kunene Region |
| Hon. Kasita | Councillor of the Epupa Constituency |
| Hon. Hendrik Gaobaeb | Councillor of the Sesfontein Constituency |
| Mr. Daniel Zaire | MME |
| Mr. John Langford | NAMPOWER |
| Mr. Basil Dax | NAMPOWER |
| Ms. Stephanie van Zyl | Enviro Dynamics |
| Mr. Ernst Simon | Urban Dynamics Africa |
| Mr. Johan de Kock | Urban Dynamics Africa |
| Mr. Uarije Karipetua | Himba Liaison Officer and Translator |
| Mr. Mike Everett | Environmental Resource Management |

Himba Community members, Government officials and private sector representatives (Attandance register available on request).

## 1. OPENING AND WELCOME

The Governor welcomed all the traditional chiefs as the leaders of the great Kunene Region and recognition was given to the presence of the very senior Chief Tjavara. The consultants were also welcomed as well as representatives of different entities and legal groups, and the community members who came from afar to this very important meeting. Last but not least, the honourable councillors of the Kunene Region from the different constituencies were welcomed. He made the request to the participants that this was their meeting and if there was anything someone would like to ask or say that they did not hesitate to speak their minds. He hoped and believed that this meeting would be remembered as very important in the history of our lives.

## 2. INTRODUCTION AND PURPOSE OF MEETING

Mr. Zaire introduced himself and presented a short address on behalf of the Honourable Minister of the Ministry of Mines and Energy. The Honourable Minister expressed his sincere gratitude to all present at an historical fact-finding energy crisis solution in Namibia. He wanted personally to address this meeting but given the last minute obligation inherent of his mission he had requested Mr. Zaire to represent him.

Mr. Zaire declared that it was an honour and privilege to address the meeting and introduced the expert team. He continued with the speech of the Honourable Minister that at the Millennium Summit at

Johannesburg in 2002 energy was explicitly recognised as a key element in achieving the Millennium Development Goals. Development cannot be achieved without sufficient quality and quantity of energy at a reasonable cost and that energy is the key to raising living standards. The challenge in the energy sector of Namibia remains an over reliance and irrational consumption of non-renewable resources. Namibian citizens need access to a common energy and one effort is to pull resources and combine the efforts of all stakeholders for the development of Namibia. The Honourable Minister remains convinced that discussion during the various meetings and contributions of eminent experts in ESIA as well as technical sectors will come out with clear recommendations for a secure, peaceful and efficient use of the Orokawe Hydro option. Peace and security were stated as our biggest concerns and sustainable development the overriding objective. He again emphasised sustainable development as the objective. Mr. Zaire thanked all who made an effort to attend this meeting.

## 3. PRESENTATION OVERVIEW

Mr. Zaire handed over the microphone to Mr. Simon who commenced with explaining the outline of the presentation and introduced the team members at the meeting. Mr. Zaire did the translation into Otjiherero at the meeting.

Too much ambient light at Epupa made it impossible to project the presentation visibly onto a screen. Use was thus made of Flipcharts prepared the previous evening. The structure of the presentation for the meeting was specified by Mr. Simon to occur in the following sequence:

- Review of the ESIA process by Mr. Simon;
- The need for and technical aspects of the proposed project by Mr. Langford;
- Project background and potential bio-physical impacts by Mr. Everett;
- Potential social, cultural and economic impacts by Mr. Simon;
- Group work by participants at meeting;
- Reporting of issues/concerns by group representative;
- Conclusion and closure by Mr. Simon.

## 4. QUESTIONS AND ISSUES RAISED DURING PRESENTATION

The following questions and issues were raised during the technical presentation of Mr. Langford:

- Councillor Mutambo, a member of Paramount Chief Kapika's royal family, extended a word of welcome to the Governor and declared that the Himba are peace-loving and should be accepted. He first requested that time was needed to caucus amongst themselves. He proceeded that there were two groups claiming the authenticity of Orokawe, but Orokawe falls under the constituency of Epupa under the leadership of Kapika. Orokawe to them is regarded as a grazing area although people still talked about Orokawe, and his main concern was the small amount of people resident at Orokawe and Epupa. He judged the reason government and experts approached this area is that the Himba are regarded a minority group, questioning the reason for the team's presence to applause from the crowd. Councillor Mutambo further asked whether 2000-3000 workers were to come from outside the Kaokoland.

**Mr. Langford replied that this request was understandable and that the team would be there for two days and there should be more than enough time to come back with questions.**

**Mr. Langford interrupted the discussion held in Otjiherero between Mr. Zaire and Councillor Mutambo as they were moving away from the structure of the meeting. Mr. Simon agrees that the gun was jumped as an opportunity for questions would be allowed for during the group work. Mr. Simon maintained that it was important to first understand the process, stating the purpose of this discussion was to ask Mr. Langford for clarification about the technical issues relating to the dam.**

**Mr. Alberto of the Legal Assistance Centre clarified the concerns Councillor Mutambo made because it were the concerns raised during the presentation at Opuwo, hence he argues, the importance of translation. The environmentalists needed this particular information in order to assess the necessity thereof although this information was not being translated. He continued that Mr. Zaire wanted to reply to it which was unnecessary at that stage. The information should have been conveyed or the participants at the meeting should have been informed that during group work these issues could be discussed. The issues would then be embodied into a document which is to be reported back to the group, rather than creating a verbal disagreement between the team and the participant.**

**Chief Councillor Kitaura agreed that what occurred at the Opuwo meeting could be repeated at Epupa. He requested the community proceeded with the programme as it is and the questions could then be raised afterwards. Mr. Simon asked if everyone agreed to this, which was accepted.**

On the ESIA process the following questions were raised:

- Chief Councillor Kitaura wanted to follow-up on the issue raised by Chief Councillor Mutambo. He reminded the participants that Chief Councillor Mutambo is a young man who knows a lot but the senior guys knew best. He again brought up the issue of Himba illiteracy; requesting that concerns should therefore be raised verbally.

  **Mr. Simon gave reassurance that the team respected their rights, that the area belong to the Himba, which is further recognised as being very important to them. Councillor Kasita responded that he wanted to explain something clearly. He urged the participants to understand that the Government of Namibia is a democratic country where everyone has equal rights and although we internationally talked about minority and majority groups, he personally do not believe in an independent Namibia reference should be made to minority or majority groups specifically. Most importantly, he humbly requested that the people of the area not regard themselves as uneducated minority groups that government is seeking to discriminate against or undermine. In his opinion, the government proved it respected the views of the people in deciding not to continue constructing a dam at Epupa.**

## 5. QUESTIONS AND ISSUES RAISED DURING GROUP WORK

Mr. Simon proposed to the participants they be divided into six groups with each receiving a Flipchart sheet and some pens to write down their perceived negative and positive impacts of the proposed dam at Orokawe. In each group, someone was needed who could write and someone to report back was to be identified for explaining to the team the group's concerns/issues the following morning. Groupings were proposed by the team which evoked some debate:

- Chief Councillor Kitaura requested that the group of Chief Kapika first have a chance to do some brainstorming before the group work could commence the following morning. An advisor of Chief Tjambiro and Chief Councillor of the Tjimba Chief supported the idea to first hold their own brainstorming session.

- The Governor proposed that the groupings should be changed which were accepted. The Governor stated that the group work was the brainstorming session and there would be enough time until the following morning to brainstorm for issues/concerns so that the team could put it all together.

- Paramount Chief Tjivare stood up and addressed the meeting. He said that he was at the meeting since the morning and was listening very carefully but he did not know who to confer or listen to because the other Paramount Chiefs were not present. He wondered how the group work could continue without the presence of those two chiefs not amongst us. He also feared that what happened in the past may again hamper the way forward, as he imagined. He thanked the team who facilitated the meeting, but he hesitated for allowing the group work to continue and could not support it. The crowd applauded.

- The Governor was under the impression the request to hold separate group work by the Chief Councillors meant that the process could continue. He understood that those under the leadership of the Chiefs not present do not have the authority to confer on such issues. They could therefore make a mistake, agreeing with Chief Tjivare. He stated that he would be happy to postpone the meeting and come back again at a later stage when the Chiefs were there, as he believed the consultants could also come another time. It was only unfortunate as this meeting was pre-arranged and everybody informed.

- Mr. Simon took it all back to the purpose of the meeting. The purpose it was stated was not to take a decision, nor was this representative of words that were spoken, it was solely about what every person felt in their harts and the worries they had about the dam construction. It does not commit anybody or any chiefs to anything. The reason was for the team to identify issues and concerns, and he failed to see why this meeting could not continue without the absent chiefs as the team would in any case come back again to report on these issues. Should any additional issues or concerns thus arise after the meeting, anyone was still welcome and free to report this to the community liaison officer who would transmit this to him. He stated that he would find it very difficult to postpone the meeting as it had cost and time constraints urging them to reconsider the idea to abandon the meeting. The people that were at Windhoek and Opuwo would have seen what we do in the sense that it is simply issues that are provided by the community that we can investigate later on.

- The Kunene Regional Councillor also requested the group work to continue for the compilation of the report in order to obtain feedback on the meetings to the groups.

- Chief Councillor Mutambo believed that everything was going well, advising that the group work should continue without wasting time.

- A message was received from Chief Kapika by one of his advisors. Chief Kapika relayed that he was informed about the happenings in the Epupa area, but they unfortunately misunderstood the meeting to be only for people from the Epupa area. He duly extended his apologies for not attending the meeting.

The meeting on the first day was concluded with notifying the participants that a slide show was to be displayed in the evening to present the Orokawe site to those unfamiliar to the area with maps of the proposed dam extent and examples of similar dams that were constructed elsewhere. This was to give an indication of the scale of the project to the participants.

Representatives from each group reported back the issues/concerns back to the team the following morning. These were summarised together as follows. It must, however, be made clear that one of the groups were very negative towards the proposed project and actually stated that they do not support the project and are against it. The Otjihungiriro, yomatungiro tjondama yaro-Kawe Group represented by the Honorary Councillor Murorua stated that they do not see any positives in the development and that even the positive issues to them were regarded as negative.

| Issue | Stakeholder concerns and questions |
|---|---|
| **Socio-Cultural** | There are +- 10 ancestral graves that will be lost at Orokawe.<br>Cultural change will erode Himba tradition.<br>2000-3000 men from outside the Kunene will impregnate Himba women and community end up with children from fathers that cannot be identified and unmarried women<br>Unmarried, outside workers, will not contribute financially to poor households.<br>Inundation of graves against Himba culture. |
| **Modern Services** | **Negative responses:**<br>Health facilities and schools will negatively affect our lives: Schools take children away from herding work and without herding work, schooling cannot be paid for.<br>**Positive responses:**<br>Without power no school, clinics, roads, ambulances etc. available<br>Creation of a police station at Orokawe |
| **Land and Ownership** | **Negative responses:**<br>Homesteads will have to be removed and displacement of households.<br>The dam will lead to dispossession and contribute to our loss of land. |

| | |
|---|---|
| | New areas where people are to be relocated are unknown to them. |
| | Loss of gardens, grazing, bee hives and fruit trees. |
| | Barrier effect (road construction fragment landscape and dam destroy crossing points) |
| | Road will damage natural beauty of place |
| | We will loose our human dignity. |
| **Health** | Occurrence of STDs and HIV/Aids, which is reportedly the lowest in years, will spread. |
| **Social Pathologies** | More people will lead to increasing crime rates and theft |
| | Orphans |
| | Alcohol and drug abuse. |
| | Rape and prostitution |
| **Economic** | **Negative responses:** |
| | New roads are unnecessary, although a main road might be helpful. |
| | Might have to pay to cross border and therefore not beneficial to community. |
| | The dam will lead to underdevelopment of community. |
| | Poor likelihood of jobs to locals. |
| | Damage to natural resource will be detrimental to tourism if mismanaged, thereby diminish attraction of area, which is one of our main resources. |
| | Creation of jobs will destroy traditional practices and lifestyle. |
| | A bridge construction between Angola and Namibia will be adverse on our community. |
| | **Positive responses:** |
| | Boost local and regional economic growth and lead to development. |
| | Less crime through employment. |
| | More employment creation and better opportunities. |
| | An official border post at Orokawe and construction of a bridge will open area. |
| | Improvement and upgrading of road infrastructure. |
| | Self sufficiency in electricity supply for the country. |
| | Increasing trade integration between Angola and Namibia. |
| | Increasing accessibility though road connection. |

| | |
|---|---|
| | Standard of living will improve.<br>Rural electrification.<br>Create food security. |
| **Groundwater and Water Resources** | The number of people that can draw water will be minimised.<br>Relocation will cause concentration of people in some area that puts pressure on scarce water resources. |
| **Pollution** | Water and earth pollution will negatively affect living conditions of all people and animals surrounding project site. |
| **Aquatic Ecology** | Water species may be affected (fish and crocodiles)<br>Adverse effect on river ecology. |
| **Terrestrial habitats** | Threatened plants will be destroyed.<br>The trees will die. |
| **Wildlife** | Loss of wildlife and species might die out. |

## 6. FINAL REMARKS AND CLOSURE

The Honourable Governor Mr. Kasita closed the meeting on the final day by addressing the participants in Otjiherero. He thanked all and adjourned the public meeting.

| | |
|---|---|
| Subject/Ref | Baynes Hydropower ESHIA |
| Venue | Luanda city, province of Luanda |
| Date of Meeting | June 29th |

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The Permanent Joint Technical Commission on the River Cunene Basin (PJTC) in collaboration with Holisticos and the Angola Research Institute (A-IP) as consultants to the project hosted a meeting as part of the preparation of the Baynes Hydropower project in Luanda on June 29th. The meeting gathered 61 participants among members from various fields of expertise, NGOs, academics, professionals, the media, central and local governmental officials, interested individuals and the private sector. The presentation consisted in providing information on the Baynes project as well as provide participants with the (i) background information on the Baynes project and the work done to date by the PJTC; (ii) steps involved in the implementation process of the EIA; (iii) present the identified potential environmental, economic, social and health impact; (iv) provide mitigations measures to date; (v) gather questions/issues raised by the participants on the information provided and (v) respond to the participants questions.

The presentation used visual aid and was shared between the local consultants and the Permanent Joint Commission for the Cunene River.

The main points raised by the participants were as follows:

| **Issue** | **Stakeholder concerns and questions** |
|---|---|
| Water Quality | -The EIS team needs to consider the water quality of the dam during the construction phase, particularly during the filling of the dam. How will it be done and how long will it take? |
| Human Resettlement | --Make sure that the people who will be resettled will be relocated to appropriate places with good conditions and will not be affected by other future relocations. |
| De-Mining | Where will the de-mining take place and in what phase (scoping or construction)? |
| Ecological flow | -Detailed studies on the water flow will need to be undertaken as the filling of the dam might take some years and it will affect the water flow of the river<br><br>-Attention should be given to the ecological flow has it impacts on the environment downstream<br><br>-Only recently the Cunene river goes to the ocean, it is a young river and its river banks are still being defined. The Kalahari deserts moves north and the Cunene river, if weak, will be insufficient to carry down the desert sand to the sea |

| Issue | Stakeholder concerns and questions |
|---|---|
| Loss of sediments | -The Baía dos Tigres will be affected by the dam as it will decrease and limit to amount of sediments carried down the river which might in turn result in the loss of this Bay<br><br>-The Baía dos Tigres is currently an island (the marine currents go from south to north), is the project going to support the erosion or will it be able to maintain the flow of sediments so the Baía is protected?<br><br>-Studies done 10 years ago on the Cunene river mouth and Baía dos Tigres should be revisited |
| Environmental legislation | -The EIS should consider the Angolan decrees on environmental impact assessment (nº. 51/04) and environmental licensing (nº. 59/07) |
| Building of the dam | -The construction of the dam will not affect the course of the river as it will be deviated so as to enable it to carry water and solid matter.<br><br>-The filling of the dam will be planned.<br><br>-The construction and filling of the dam will result on erosion in the river banks. |
| Social benefits | -The project will involve a huge number of local work force (500) who will be trained during the construction phase, thus a training school should be established in the area |
| Issues on health and agriculture | -The Food Safety Office from the Ministry of Agriculture has recently conducted a study in the area and will haply provide the report which has relevant information on health issues and agriculture practices<br><br>-Cunene has an extensive farming area that should not be affected by the project, particularly with regards to access to water |
| Positive impacts | -Positive impacts should be highlighted. The local people should be the first one to benefit from the positive impacts |
| Protected areas | -The existence of the Iona National Park and the Skeleton Coast Park should be considered as well as the impacts on the biodiversity of these protected areas |
| Surrounding areas | The study should also focus on the surrounding areas such as the aerial transmission lines and other areas which will be impacted by the Baynes project |
| Access to information | -Access to information should be improved, the site should have more information and this info should also be translated into Portuguese, local contact details should be added to the site |
| Site alternatives | -Will the study (EIS) analyse the three alternatives? The scoping phase should clarify which one should be the emphasis of the study |

| Issue | Stakeholder concerns and questions |
|---|---|
| Cunene river mouth | -The study should also focus on the Cunene river mouth particularly with regards to its ecological, social and economic importance<br><br>-The river mouth is very sensitive and is also used as resting point and source of sweet water by migratory birds from South Africa and Europe, thus it cannot be affected both in terms of flooding or to dry |
| Seismic | -The geology of the area should be seriously considered as the filling of the dam and construction work could cause pressure on the land and river banks resulting in significant geological changes.<br><br>-Studies on the seismicity should be undertaken |

| | |
|---|---|
| Subject/Ref | Baynes Hydropower ESHIA |
| Venue | Iona city, province of Namibe |
| Date of Meeting | June 24th |

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The Angola Research Institute (A-IP) in representation of the Permanent Joint Technical Commission on the River Cunene Bassin (PJTC) facilitated a meeting as part of the preparation of the Baynes Hydropower project. The meeting gathered 56 participants among members of the communal administration, representatives from civil society organisations professional associations, churches, the private sector and traditional authorities. In addition, members from the municipal administration joined the meeting.

The main objective of the meeting was to consult with the population at large and traditional authorities in project affected areas on the process of the impact environmental assessment in regards to the Baynes Hidro electrical power project. The specific objective was to present the participants with (i) background information on the Baynes project and the work done to date by the PJTC; (ii) steps involved in the implementation process of the EIA; (iii) present the identified potential environmental, economic, social and health impact; (iv) provide mitigations measures to date; (v) gather questions/issues raised by the participants on the information provided and (v) respond to the participants questions.

The methods used in the meeting differed from the one implemented in Epupa. Given the mixed audience and the limited understanding of the Portuguese language by some participants, a visualised presentation composed of 10 slides was presented to the participants so as to guarantee greater participation and greater understanding. Secondly, it was decided not to distribute cards to gather participants opinions and let participants express themselves freely given the difficulty some of the participants may have in articulating ideas on cards.

The main points raised by the participants were as follows:

| **Issue** | **Stakeholder concerns and questions** |
|---|---|
| Expectations of the project benefit to the population | -Will the project bring specific support to agriculture<br>-Will the project improve conditions for livestock herding<br>-Will the project bring concrete benefit in the main communities activities such as agriculture, livestock and trade |

| Issue | Stakeholder concerns and questions |
|---|---|
| Protection of local culture | -The Project should protect and maintain the local culture<br>-The Project should be used to promote the culture of the Himba population |
| Trade | -The Project should promote local trade |
| Employment opportunities to youth | -The project should ensure employment and to youth in particular<br>-The project should provide training to the youth and the unemployed in particular |
| Access | -The Project should improve access, roads and communication in general so as to bring development in the area |
| Expectations to improve well-being and means of livelihoods | -The project should promote agriculture and improve the conditions for livestock herding |
| Brigdes | -The project should built a bridge along the road from Namibe to Tombwa and within the Namibe province |
| Basic services (health) | -Hopes that the Project will improve the supply of basic services of quality and health(hospital) in general |
| Meeting with the Namibian traditional leaders | -A meeting should take place with the Namibian traditional authorities so as to discuss their point of view in regards to the Project |
| Use of Namibe port | -Hope that the materials and equipments to the Project will be carried through the Namibe port so as to create employment and increase trade activities for the province |

The municipal administrator closed the meeting by reiterating the needs for the participants to disseminate the information provided in the meeting to others so as to ensure that people are aware to the project.

| | |
|---|---|
| Subject/Ref | Baynes Hydropower ESHIA |
| Venue | Tombwa city, province of Namibe |
| Date of Meeting | June 16th |

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The Permanent Joint Technical Commission on the Cunene River Basin (PJTC) in joint efforts with the Angola Research Institute (A-IP) held a public consultation as part of the preparation of the Baynes Hydropower project. The consultation gathered 57 participants among members of the municipal administrations, representatives from civil society organisations such as non-governmental organisations, professional associations, churches, the private sector and traditional authorities. In addition, members from provincial Namibe government and central government joined the meeting (see list of participants in the annex). Members from the Permanent Joint Technical Commission on the River Cunene Bassin (PTTC) of the Namibian government also took part in the course of the meeting as previously planned.

The main objective of the meeting was to provide participants with information on the process of the impact environmental assessment in regards to the Baynes Hidro electrical power project. The specific objective was to present the participants with (i) background information on the Baynes project and the wok done to date by the PJTC; (ii) steps involved in the implementation process of the EIA; (iii) present the identified potential environmental, economic, social and health impact; (iv) provide mitigations measures to date; (v) gather questions/issues raised by the participants on the information provided and (v) respond to the participants questions.

The methods used in the meeting differed from the one implemented in Epupa. Given the mixed audience and the limited understanding of the Portuguese language by some participants, the power point presentation was simplified into 10 slides so as to guarantee greater participation. Secondly, it was decided not to distribute cards to gather participants opinions and let participants express themselves freely given the difficulty some of the participants may have in articulating ideas on cards.

The municipal Administrator Mr Jõao Guerra opened the meeting by greetings the participants and by highlighting the importance for every one in the municipality to be involved since the beginning in the project. After the presentation of the power point, the issues raised by the participants were as follows:

| **Issues raised** | **By whom** |
|---|---|
| 1.What are the mechanisms in place by Government to ensure that the local population and local interests will be protected | Private sector |
| 2. The project should think about using visual aid for the community that have difficulty in reading and/or understanding technical aspects of the project. The visual aid should show what will be the benefit of the project for the local population | Traditional leader |
| 3. Why is it that the project is using an English word Baynes<br>What is the concrete location of the project | Civil society |
| 4. What are the benefit in terms of percentage between Angola | |

| | |
|---|---|
| and Namibia | |
| 5. What is the prevision of the production of the dam | Member of Municipal Administration |
| 6. What will be the capacity for the dam.<br>It seems that there is a sub position with Baia de Tigres project | Civil Society |
| 7. The project should put together a local team to work with the project team so as to ensure that local language will be sued<br>The project should do a study how to involve local population<br>What is the total amount of the project?<br>What will be the division of the budget with the government of Namibia? | Civil society |
| 8. We heard that the Government of Namibia has already registered the number of people that live in the area of he project, when will this happen here?<br>Will a highway go through Tombwa to get tot eh area of the project?<br>If yes, what will be the impact? | Civil Society |
| 9. What is the time line of the project?<br>How will the mobilization of the communities in the areas of the project done so as to ensure their participation?<br>The project should develop synergy with the University of Namibe through some type of partnership so as to work together on some issues | Municipal Administrator |
| 10. What the project intends to do to ensure that the local work force will be hired? | Civil Society |

The municipal administrator closed the meeting by reiterating the needs for the citizens in Tombwa to prepare and organise themselves for the venue of the project. The Administrator offered to accompany the delegation to Iona and it was jointly decided that the Iona meeting will be implemented into two parts. The first will take place as planned on June 24$^{th}$ and will target traditional leaders and members of the comuna. The second meting will take place on July 30$^{th}$ and will target the population at large of the project area.

**IMPACTE AMBIENTAL E SOCIAL – AVALIAÇÃO DO PROJECTO HIDROELÉCTRICO BINACIONAL DE BAYNES PROPOSTO.**

# Convite à Reuniões de Consulta Pública

## Contexto do Projecto

Devido ao aumento da procura de Energia desde a Década de 90 na região Austral de África, e no âmbito do programa de desenvolvimento de ambos os Países, os Governos de Angola e da Namíbia, através da Comissão Técnica Permanente Conjunta para a Bacía do Rio Cunene – CTPC, decidiram levar a cabo um Estudo de Viabilidade para a localidade de BAYNES, à 40 km à jusante de EPUPA (Quedas de Monte Negro). A CTPC, indicou o Consórcio Cunene, constituído por 4 (quatro) empresas Brasileiras de Projectos de Engenharia, nomeadamente Odebrecht, Engevix, electrobrás e Furnas que na base do Estudo feito em 1998 elaborará um novo Estudo. A CTPC, indicou tambem um Consórcio cnstituído pelas Empresas Environmental Resources Management – ERM, Urban Dynamics, A-IP, Holísticos, Enviro-Dynamics e IRDNC para conduzir um estudo independente sobre os impactes Ambiental e Social para o projecto proposto em conformidade com as Normas de desempenho das organizações Internacionais.

## Convite à Comentários

Para obter informações sobre o Projecto e colocar questões e preocupações, convidamos-lhe a estar presente numa série de reuniões de consultas públicas que serão realizadas em Angola e na Namíbia, como descrito abaixo:

| Cidade | Local da Reunião | Data | Hora |
|---|---|---|---|
| Luanda | Hotel Trópico | 19/06 | 09H00 |
| Tombwa | AdM Municipal | 16/06 | 11H00 |
| Iona | AdM Comunal | 24/06 | 09H00 |

o projecto ou registar-se como parte interessada, por favor contacte:


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# BACKGROUND INFORMATION DOCUMENT (BID)

## PROPOSED 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 Cunene River. 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 1970's, 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[1] conducted a full Feasibility Study and EIA for the Epupa Project. During the study all possible hydropower development sites along the Cunene 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[2] 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@uda.com.na

or Joana Huongo at Holisticos (Angola):

**Landline & Fax:** +244 222398037
**E-mail:** holisticos@gmail.com

[1] NamAng is a consortium comprising Norconsult (Norway), SwedPower (Sweden), Burmeister and Partners (Namibia) and SOAPRO (Angola).
[2] The Himba are an indigenous people who are potentially directly affected by this project.

***Locality***

The Cunene River Basin represents an area of 106 500km$^2$ (See Figure 1). The Cunene 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 proposed Baynes Site on the Cunene River.

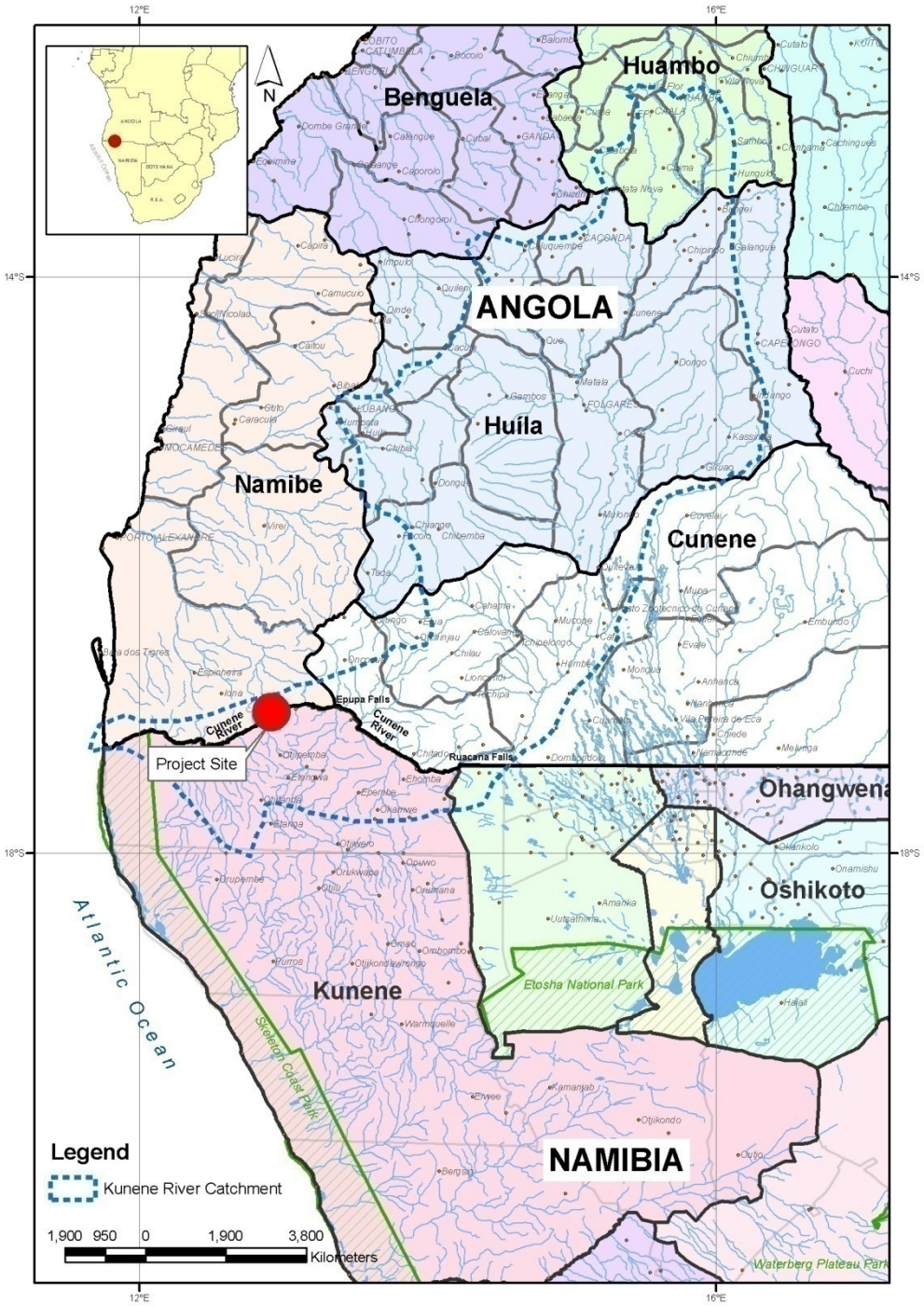


***Figure 1: Locality of the proposed Baynes Hydropower Project in relation to the Cunene River catchment.***

## Current Proposal and Associated Studies

### *Introduction*

Over the past decade, local and regional power demand has increased, especially for mid-merit and peak electricity[3]. In 2007 the power demand and supply for the region stood at 50,000MW. This has necessitated the Permanent Joint Technical Commission (PJTC) to further consider the development of the Baynes Hydropower Project. Meanwhile other alternatives such as a coal fired power station at Walvis Bay, Namibia, the Kudu Gas Power Station, 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. The Feasibility Study comprises 3 phases, all of which are due for completion by the end of March 2010. Phase 1 of the Feasibility Study has been completed and Phase 2 is due at the end of April 2009. The Phase 1 document reports on secondary data collected, gaps identified, and recommendations on studies to be carried out during Phase 2 and 3. Phase 2 will concentrate on the alternative dam locations, while Phase 3 will concentrate on the selected dam location and its feasibility and viability.

### *Alternative Sites*

The three alternative sites under consideration are all within a few kilometers of the original proposed Baynes Site. The three sites have been selected to find the best technical, economic, environmental, and social solution in the Baynes Gorge that would not inundate the Epupa Falls. Two smaller dams may also be considered, same vicinity as the original three sites.

Three alternative dam wall heights are being 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 will depend 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 proposed Baynes Hydropower Project cannot operate in isolation. Thus, the Techno-economic Team is considering 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 will be compared and considered.

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

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*[3] 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 is therefore typically started and stopped twice a day during weekdays.*

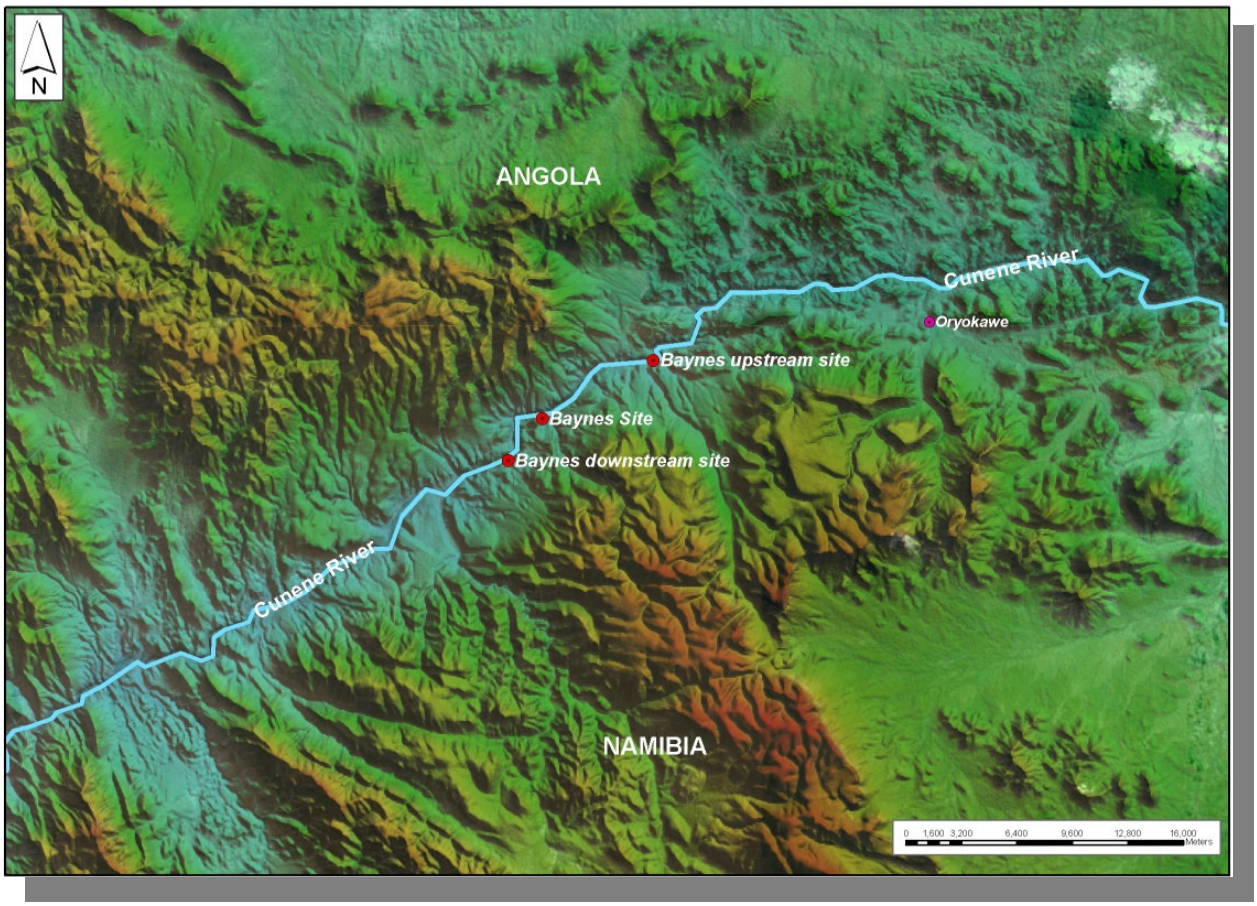


*Figure 2: Locality of the three alternative sites in the Project area.*

***Aspects Covered***

The following are aspects being 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 are being tested for suitability.
- ***Geological surveys:*** The Cunene Consortium will carry 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 cover only 12 years of readings (1961 to 1972). These records will be correlated with the data set for the Okavango/Cubango River, which contains 50 years of readings (1945-1994). Several analyses and data consistency checks will also be made to verify and validate the flow data obtained from Ruacana.
- ***Flood discharge studies:*** An in-depth flood discharge study will be conducted to fill the gaps in data. This will involve obtaining and comparing long term flood records for the Higher Zambezi River (considering appropriate deductions for the Cunene River) and consideration to the extenuating effects of the flood plains in the Cunene between Matunto and Roçados (Xangongo).
- ***Flow regimen:*** A hydrometric survey will be 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 will be 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 will also be conducted.
- ***Evaporation studies:*** An evaporation map is being 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 will be 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 construction and maintenance of the power line from the plant to the nearest substations will be included in the ESIA. The two governments will commission separate EIAs for the transmission lines linking the projects to the respective grids.

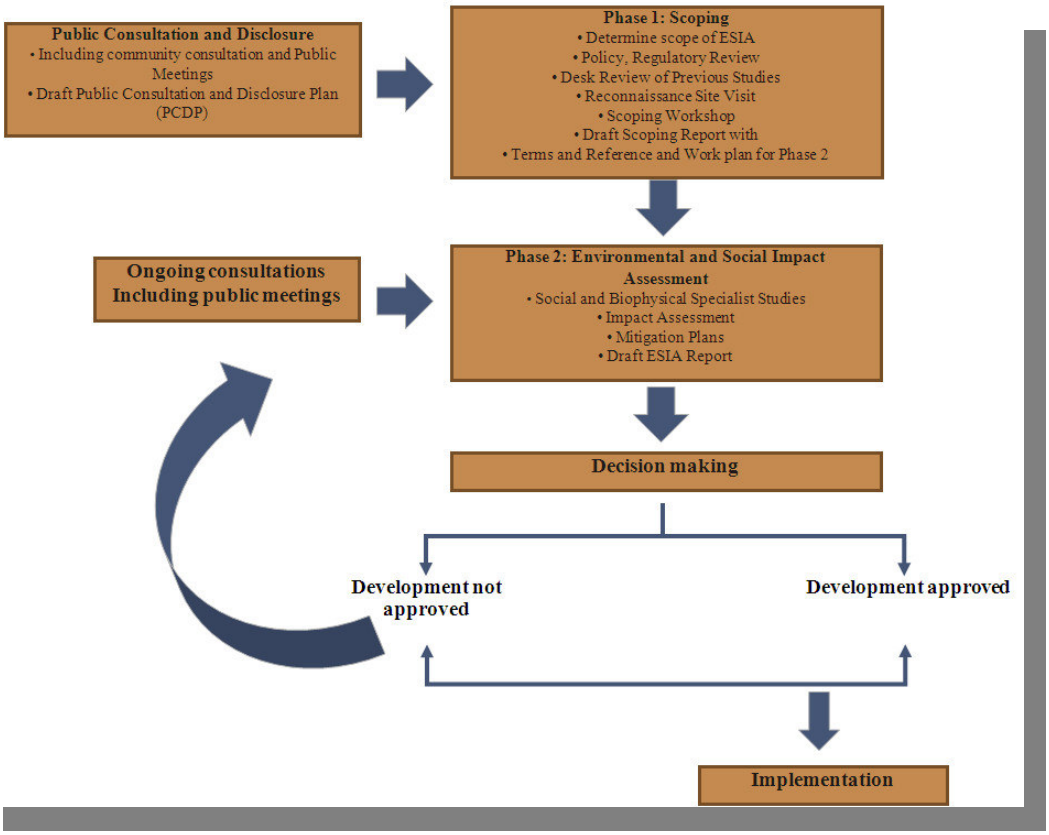


*Figure 3: The environmental assessment process.*

### *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:** which will include 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):** which will 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*

Although Angola and Namibia have policies in place relating to EIAs, they are both currently in the process of further developing their EIA legislation. Namibia's Parliament passed its Environmental Management Act in 2007, but the Act is not yet operational as the regulations are not yet gazetted. The ESIA process will follow international best practice, including compliance with the applicable Performance Standards of the International Finance Corporation (IFC). In addition the ESIA will also take cognizance of any applicable international, national, and regional conventions, treaties, guidelines and laws.

### *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 have 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 proposed 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://ww.erm.com);*
- *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.

# PROPOSED 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)
P.O. Box 20837
Windhoek
Tel: +264 (61) 228-435
Fax: +264 (61) 240-309
Mobile: 264 (81) 124-5188
E-mail: ernst@uda.com.na

Joana Huongo (Angola)
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Rua 8, Casa 410, Benfica,
Luanda
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# DOCUMENTO DE INFORMAÇÃO DE APOIO (DIA)

## PROPOSTA DE PROJECTO HIDROELÉCTRICO DE BAYNES

### ANTECEDENTES HISTÓRICOS

Em 1969, os Governos de Portugal e da África do Sul chegaram a um acordo durante a primeira fase de desenvolvimento dos recursos hídricos do Rio Cunene. Este acordo incluía um plano para o desenvolvimento de um projecto hidroeléctrico em Ruacana, e que deveria ser seguido por uma série de projectos hidroeléctricos em Epupa e ainda mais a jusante. Este acordo resultou na construção de três unidades de aproveitamento de cursos de água durante a década de 1970, nomeadamente a Barragem Gove em Angola, a Unidade de Aproveitamento Hidroeléctrico de Ruacana, localizada na Namíbia, aproximadamente a 170 km a montante da localização proposta para Baynes e a Unidade de Aproveitamento Hidroeléctrico Incompleta de Calueque, que facilita o fornecimento de água às zonas do norte da Namíbia.

Nos finais da década de 1980, a SWAWEK (agora NamPower) fez previsões acerca da crescente necessidade energética na Namíbia e começou a ponderar a construção de uma unidade de aproveitamento hidroeléctrico na zona de Epupa. Em 1991, os governos da Namíbia e de Angola concordaram em avançar com pesquisas técnicas e ambientais detalhadas, sendo que os estudos foram iniciados em 1992.

Entre 1995 e 1998, a NamAng[1] empreendeu estudos de viabilidade e de avaliação do impacto ambiental completos, para o Projecto Epupa. Durante o estudo, todas as localizações para o aproveitamento hidroeléctrico ao longo do Cunene, a jusante do Ruacana, foram investigados, tendo acabado por ser seleccionadas as localizações de Baynes e Epupa por serem as mais viáveis a nível técnico. O trabalho prosseguiu nestes dois locais, tendo sido feitas comparações ao nível técnico, social e ecológico. O Estudo de Viabilidade concluiu que a Localização de Epupa seria preferível em termos técnicos (isto é, possuía uma capacidade de armazenamento superior ), enquanto a Localização de Baynes teria menos impacto a nível social e ecológico, em consequência de uma menor área inundada , resultando numa menor destruição do habitat e dos recursos naturais , dos locais de sepultura, numa menor perda de água por evaporação e num significativamente menor impacto humano, tal como na perda de acesso a pastagens, na mudança dos habitantes para nova localizações e na perda de locais de sepultura . O Projecto Epupa teria tido mais impacto na vida local dos Himba, visto que exigiria a inundação de um vasto vale, que é usado de forma extensiva pelos agricultores e pastores. O governo da Namíbia comunicou a preferência pela Localização de Epupa, enquanto o Governo angolano dava preferência à localização de Baynes.

A oposição aos planos de uma barragem na Localização de Epupa por parte das ONGs locais e internacionais e dos Himba levou a que o projecto fosse adiado, conduzindo os dois governos a ponderar soluções de fornecimento energético alternativos, tais como a nova rede de distribuição eléctrica de 400kV para abastecimento da Namíbia com um fornecimento energético adicional da África do Sul.

Este DIA inclui:

- os antecedentes historicos e a introdução à proposta de Projecto Hidroeléctrico Baynes;
- uma síntese do Estudo de Viabilidade técnico-económica elaborado para o Projecto;
- uma introdução e uma abordagem à Avaliação dos Impactos sócio-ambientais (AISA);
- detalhes do Plano de Consulta e de Divulgação Públicas da AISA; e
- um convite para a participação pública durante a AISA

Para obter qualquer informação acerca desta AISA e do processo que será seguido, as partes interessadas ou afectadas podem contactar:

Ernst Simon na Urban Dynamics Africa (Namíbia):

**Rede Fixa:** +264(61) 228-435
**Telemóvel:** +264(81) 124-5188
**E-mail:** Ernst@uda.com.na

ou
Joana Huongo
Holísticos-Serviços, Estudos e Consultoria (Angola):

**Tel. & Fax:** +244 222398037
**E-mail:** holisticos@gmail.com

[1] A NamAng é um consórcio que inclui a Norconsult (Noruega), a SwedPower (Suécia), a Burmeister and Partners (Namíbia) e a SOAPRO (Angola).
[2] Os Himbas são as populaces indigeneas que podem serem afetados directemente pelo projecto.

***Localização***

A Bacia do Rio Cunene representa uma área de 106 500km$^2$ (Consultar a Figura 1). O Rio Cunene tem a sua nascente na zona central de Angola, perto da cidade do Huambo. O rio corre para sul em direcção à fronteira Angola/Namíbia, antes de voltar a ocidente, para traçar a fronteira entre os dois países, desaguando no Oceano Atlântico. A Figura 1 mostra a situação da Localização proposta para Baynes, no Rio Cunene.

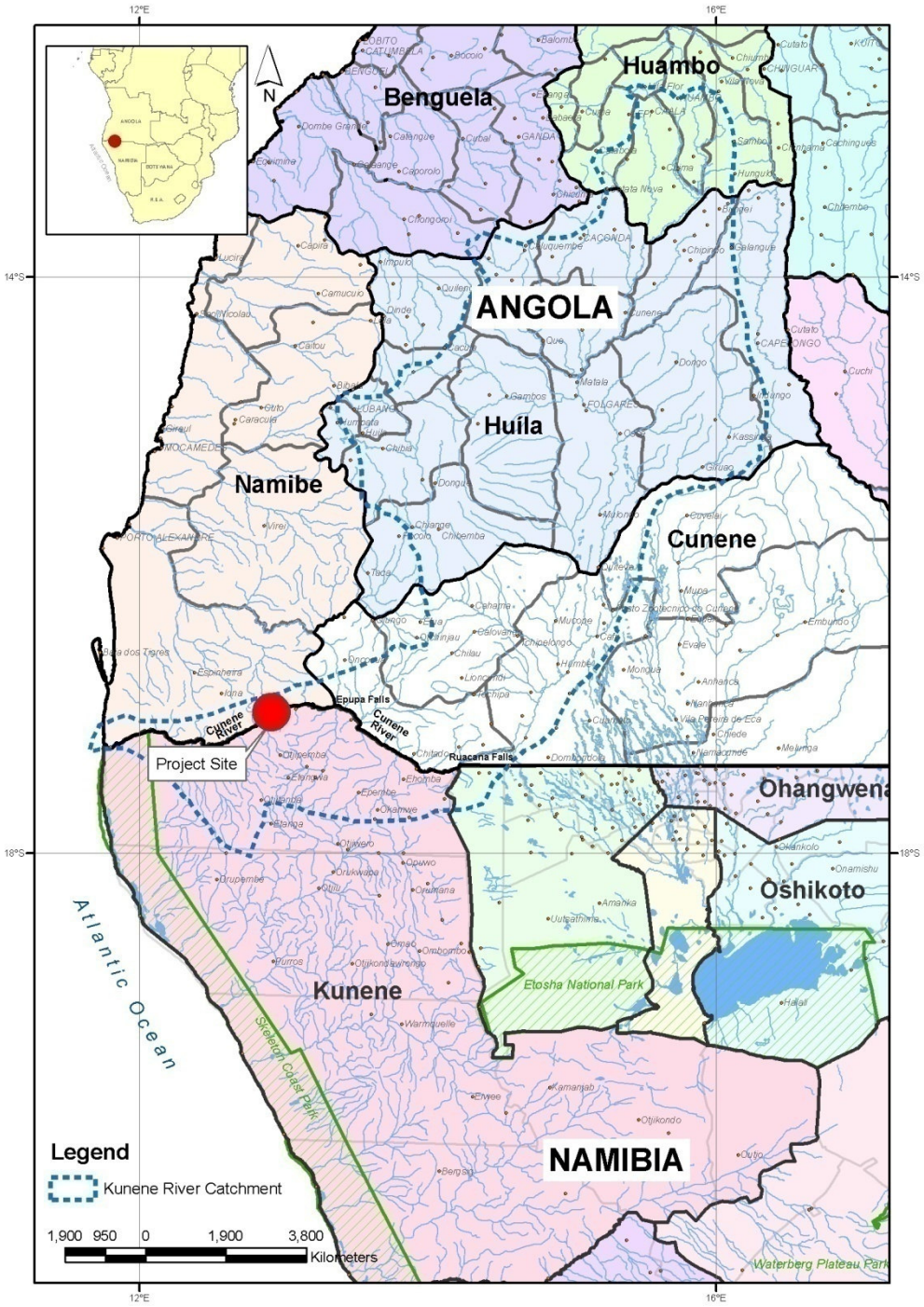


***Figura 1:*** ***Localização da proposta de Projecto Hidroeléctrico Baynes, em relação à captação do Rio Cunene.***

## A Proposta Actual e os Estudos Associados

### *Introdução*

Durante a última década, a procura energética local e regional tem aumentado, em especial nos períodos de consumo médio e elevado 3. Em 2007, a procura e a produção energética da região fixou-se em 50,000MW. Tal tornou necessário que a Permanent Joint Technical Commission (PJTC) voltasse a examinar o desenvolvimento do Projecto Hidroeléctrico de Baynes. Entretanto, outras alternativas, tais como uma central eléctrica a carvão na Baia Walvis, Namíbia, a central eléctrica a gás de Kudu, Namíbia, assim como a produção de energias nuclear, solar e eólica foram igualmente ponderadas. A PJTC nomeou o Consórcio de Cunene, que incluía quatro empresas de engenharia brasileiras, para rever o estudo de viabilidade do Projecto Hidroeléctrico de Baynes, realizado em 1998.

A PJTC nomeou a Gestão dos Recursos Ambientais (GRA), após um rigoroso processo de adjudicação internacional, com o objectivo de uma forma independente, levar a cabo a Avaliação dos Impactos sócio-ambientais (AISA) paralelamente ao estudo técnico-económico, tendo este como referência.

A PJTC irá garantir que o projecto (caso o mesmo seja implementado) e os estudos associados sejam desenvolvidos pelas duas nações, o que pressupõe a partilha de responsabilidades, custos e benefícios por parte dos dois países.

Os principais objectivos do estudo técnico-económico e da AISA, embora empreendidos de forma independente entre si, são os seguintes:

- definir a viabilidade do Projecto Hidroeléctrico de Baynes;
- alargar a esfera da pesquisa para uma possível intensificação da importância de Baynes enquanto estação de produção energética para períodos de consumo médio e alto, através da avaliação de um maior número de configurações de unidades de aproveitamento;
- analisar e avaliar a viabilidade técnica, económica e ambiental das escolhas apropriadas e, se for exequível;
- empreender um plano do nível de viabilidade e delinear directrizes para um PGA (Plano de Gestão Ambiental) para uma visão detalhada das fases de planeamento, construção, funcionamento e desactivação do Projecto.

## O Estudo de Viabilidade Técnico-Económica

### *Introdução*

O Estudo de Viabilidade Técnico-Económica iniciou-se em Junho de 2008. Este estudo compreende 3 fases, sendo que a devida conclusão das mesmas deverá ter sido atingida em Março de 2010. A Fase 1 do Estudo de Viabilidade já está concluída e espera-se que a Fase 2 termine no final de Abril de 2009. Os documentos relativos à Fase 1 dão conta dos dados secundários recolhidos, das falhas identificadas e das recomendações relativas a estudos que serão desenvolvidos durante as Fases 2 e 3. A Fase 2 irá centrar-se nas localizações alternativas para a barragem, enquanto a Fase 3 se concentrará na localização seleccionada para a barragem, bem como na sua viabilidade e praticabilidade.

### *Localizações Alternativas*

As três localizações alternativas ponderadas estão todas situadas a alguns quilómetros da localização de Baynes originalmente proposta. As três localizações foram seleccionadas com o objectivo de encontrar a melhor solução técnica, económica, ambiental e social no Vale de Baynes, que não inunde as Cascatas de Epupa. Poderão ser igualmente equacionadas duas barragens de menores dimensões, nas redondezas das três localizações originais.

Estão a ser estudadas três diferentes alturas para a parede da barragem em cada localização, mais concretamente 540m, 560m e 580m acima do nível do mar. A água encherá a bacia da barragem até essas alturas.

A escolha de uma altura óptima para a barragem dependerá de diversos critérios, que incluem: capacidade de água armazenada, considerações de engenharia e estruturais; limitações da construção e do funcionamento; e opções de produção energética.

### *Configurações alternativas*

O Projecto Hidroeléctrico de Baynes não pode funcionar isoladamente. Assim sendo, a Equipa Técnico-económica está a considerar a possível configuração combinada dos planos existentes ao longo da parte superior do Rio Cunene. Serão ponderadas e comparadas seis diferentes alternativas para se alcançar uma utilização óptima do fluxo do rio.

Independentemente da alternativa escolhida, a barragem poderia funcionar: 1) com capacidade de base 3, 2) com capacidade de pico ou média, 3) com capacidade de pico ou 4) com uma combinação destas alternativas.

(3) As Centrais Eléctricas de Capacidade base, Médias ou de Pico definem-se da seguinte forma:

- *As Centrais Eléctricas de Capacidade Base fornecem energia durante 24 horas.*
- *As Centrais Eléctricas Médias ou de Pico fornecem energia nos períodos padrão ou de consumo elevado (durante o Dia) e são normalmente iniciadas e desligadas uma vez por dia, durante os dias de semana.*
- *As Centrais eléctricas de Pico fornecem energia apenas nos períodos de consumo de pico, ou seja, das 07h00 às 10h00 e das 18h00 às 20h00, sendo, por isso, normalmente iniciadas e desligadas duas vezes por dia, durante os dias de semana.*

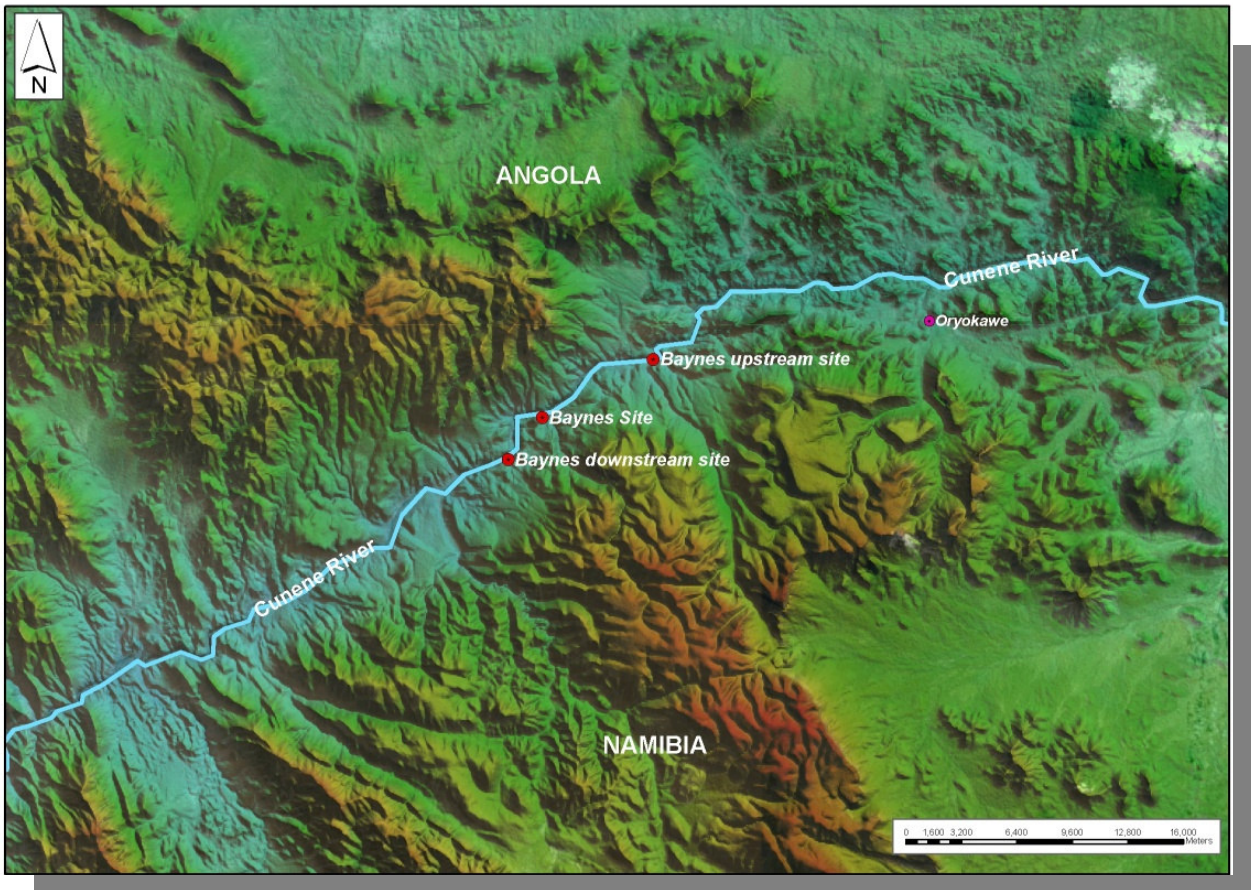


*Figura 2: Localização dos três locais alternativos na zona do Projecto.*

### *Aspectos tidos em consideração*

Em seguida, apresentamos os aspectos que estão a ser tidos em consideração pela Equipa Técnico-económica:

- ***Materiais de construção:*** A barragem irá ser feita de pedra; ou seja, será uma barragem de enrocamento. Estão a ser avaliados, no que respeita à adequação, vários locais de fornecimento de pedra localizados na zona.
- ***Avaliação geológica:*** O Consórcio Cunene irá empreender uma série de novas pesquisas para confirmar a adequação destes três locais para construção de uma reserva estável e segura.
- ***Hidrologia :*** os dados de série do fluxo hidrológico para o Rio Cunene abrangem apenas 12 anos de leituras (de 1961 a 1972). Estes registos serão correlacionados com os dados apurados para o Rio Okavango/Cubango, onde foram registados 50 anos de leituras (1945-1994). Serão efectuadas várias análises e verificações de consistência de dados para verificar e validar os dados do fluxo obtidos pela Ruacana.
- ***Estudos de descarga de inundação:*** Será levado a cabo um completo estudo de descarga de inundação para preencher as lacunas dos dados. Tal implicará a obtenção e comparação de registos respeitantes a longos períodos de tempo. A parte superior do Rio Zambeze (tendo em conta as conclusões adequadas ao Rio Cunene) sem esquecer os efeitos atenuantes da planície de inundação no Cunene, entre Matunto e Roçados (Xangongo).
- ***Regime do Fluxo:*** Será elaborado um exame hidrométrico que envolverá a coordenação com a PJTC para se conseguir a reactivação da rede de medição de caudais por parte dos respectivos governos. Um novo posto de medição de caudais será criado na Localização de Baynes, para medir os fluxos da rede e da descarga sólida. Serão realizados exames topo-batimétricos nas zonas inundadas, assim como estudos do perfil do rio.
- ***Estudos de evaporação:*** Está a ser elaborado um mapa de evaporação para a zona, de forma a determinar as perdas de água do reservatório aberto.
- ***Estudos de mercado:*** Informação como o hipotético crescimento a longo prazo, estudos sobre o mercado energético, sistemas de distribuição eléctrica, estruturas de determinação de preços, pormenores relativos a importação e exportação energética, disponibilidade energética e estruturas de energia eléctrica dos sectores Energéticos da África Oriental e Austral.

## Avaliação dos Impactos Sócio-Ambientais

O processo da AISA é uma ferramenta utilizada para reunir informação relevante, clara e objectiva para demonstrar às autoridades governamentais responsáveis de Angola e da Namíbia quais são as consequências do Projecto Hidroeléctrico de Baynes em termos biofísicos, sociais e económicos.

Os Termos de Referência para esta AISA descrevem a Bacia do Rio Cunene como sendo muito importante a nível ambiental por estas três razões principais:

- é estrategicamente importante para ambos os estados ribeirinhos enquanto fonte hidráulica e fornecedor de recursos naturais para as necessidades humanas, de irrigação, produção hidroeléctrica e para a crescente indústria turística;
- é um dos ecossistemas aquáticos que menos impactos sofreram em África , sendo a foz do Rio Cunene uma importante zona de regadio passível de ser registada enquanto Zona de Regadio de Relevância Internacional, ao abrigo da Convenção de Ramsar; e
- constituem o habitat de inúmeras espécies conhecidas de animais e plantas e, possivelmente, de outras ainda por descobrir - algumas das quais endémicas a este rio.

Foi realizada uma AISA para o Projecto Hidroeléctrico Epupa/Baynes em 1998. Este estudo foi considerado incompleto em vários aspectos; as principais críticas incluíam a percepção de uma avaliação inadequada do impacto social, assim como o desenvolvimento de uma relação de rivalidade entre as comunidades directamente afectadas, as ONGs e organizações comunitárias locais e indígenas e os governos. É comummente aceite que a opção de Epupa é controversa, e que de Baynes poderia ser uma melhor alternativa, tendo por base critérios sociais e ecológicos, incluindo a possível perda de potencial turístico, do sentido de local, de herança cultural, dos recursos naturais, bem como o deslocamento populacional.

### *Objectivo*

O principal objectivo da AISA é a realização de um Relatório de Avaliação do Impacto Sócio-Ambiental robusto e independente, que satisfaça as melhores práticas, assim como os requisitos nacionais e internacionais aplicáveis no processo de avaliação sócio-ambiental e na consulta e divulgação públicas.

### *Componentes do Projecto que serão abrangidos pela AISA*

A AISA irá abranger os vários aspectos da construção e do enchimento da barragem, da instalação das turbinas e da infra-estrutura da central eléctrica, da construção do posto de transformação e das estruturas auxiliares. A AISA irá também avaliar o funcionamento e manutenção da barragem e da unidade de aproveitamento hidroeléctrico. A construção e manutenção da rede eléctrica, a partir da central para as sub-centrais mais próximas, serão incluídas na AISA. Os dois governos irão ordenar a realização de duas AISAS diferentes para as linhas de transmissão que ligam os projectos às respectivas grelhas.

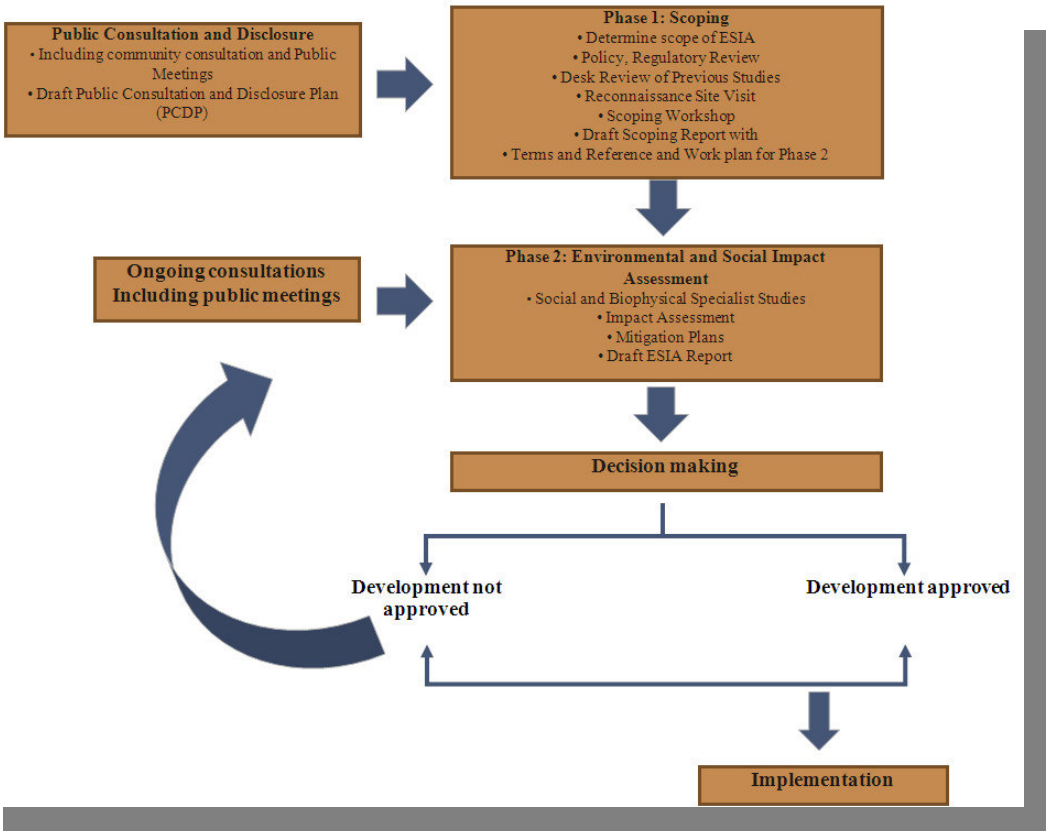


*Figura 3: O processo de avaliação ambiental que deverá ser seguido*

### *Âmbito do Trabalho*

Esta AISA, tendo contemplado uma vasta série de temas estratégicos, centra-se principalmente nas alternativas associadas ao projecto e relacionadas com a localização de Baynes . A AISA independente deverá ser conduzida em duas fases, a saber :

- ***Fase 1 - Determinação:*** irá contar com o fervoroso empenho das partes envolvidas, o que permitirá à Equipa da AISIA desenvolver os Termos de Referência e o Plano de Trabalho em preparação para a Fase 2 do estudo, e
- ***Fase 2 - Avaliação do Impacto Sócio-Ambiental (AISA):***a AISA irá incluir uma avaliação abrangente dos impactos do projecto no ambiente, assim como dos efeitos do ambiente no projecto.

A AISA não incluirá a compilação de um PGA e, por essa razão, não facultará uma avaliação dos impactos da desactivação. No entanto, a mesma emitirá directrizes para aquilo que deverá constar de um PGA, incluindo a necessidade de considerar os impactos da desactivação.

### *Enquadramento Legal*

Embora Angola e Namíbia tenham políticas relativas às AISAS , ambos os países encontram-se actualmente num processo de maior desenvolvimento da legislação relativa às AISAs . O Parlamento da Namíbia aprovou a Lei da Gestão Ambiental em 2007, mas esta ainda não se encontra em vigor, visto os regulamentos ainda não terem sido publicados. O processo da AISA vai seguir as melhores práticas internacionais , incluindo o cumprimento dos Padrões de Desempenho aplicáveis da International Finance Corporation (IFC). Adicionalmente, a AISA irá igualmente ter conhecimento de quaisquer convenções internacionais, nacionais ou regionais aplicáveis, assim como tratados, directrizes e leis.

### *Revisão externa*

O SAIEA (Southern African Institute of Environmental Assessment) irá intervir enquanto revisor externo da AISA. O SAIEA irá rever a AISA e verificá-la de perto, a fim de assegurar que ela vai ao encontro das melhores práticas e dos requisitos legais.

### Plano de Consulta e Divulgação Públicas (PCDP)

A Consulta e a Divulgação Públicas são consideradas funções essenciais da AISA. Foi delineado um Plano de Consulta e de Divulgação Públicas em concordância com as directrizes da IFC, o qual sublinha a forma como a divulgação e consulta se realizarão ao longo do processo da AISA e para além dele.

Os objectivos da PCDP são os seguintes:

- *Assegurar que todas as partes interessadas sejam incluídas no processo de Consulta e Divulgação.*
- *Garantir que a divulgação da informação inicial acerca do projecto seja adequada e inteligível para as partes interessadas sem conhecimentos técnicos e para a população local.*
- *Assegurar que a informação adequada e atempada seja facultada às pessoas afectadas pelo projecto e às outras partes interessadas;*
- *Garantir que todas as partes interessadas tenham a oportunidade de expressar as suas opiniões e preocupações;*
- *Assegurar que estas opiniões e preocupações tenham influência sobre as decisões relativas ao projecto;*
- *Garantir que seja dado feedback regularmente às pessoas afectadas pelo projecto; e*
- *Assegurar que a comunicação efectiva se mantenha durante as fases de construção e de funcionamento do projecto proposto.*

Nunca é demais frisar a importância de uma participação pública alargada e efectiva no processo da AISA. A PJTC e a Equipa da AISA estão empenhadas numa comunicação activa e contínuam com todas as comunidades, organizações, grupos e indivíduos com interesse na proposta de Projecto Hidroeléctrico de Baynes.

### *Como pode participar?*

- *Ao assistir às reuniões públicas que se realizarão durante o processo da AISA (as mesmas irão ser publicitadas nos media);*
- *Ao visitar o sítio do Projecto na Internet ( http://ww.erm.com);*
- *Ao entrar em contacto telefónico com os porta-vozes da AISA, para obter mais informações; e*
- *Ao rever os relatórios preliminares quando for convidado a fazê-lo e dentro dos prazos fornecidos.*

Por favor, certifique-se de que está registado na base de dados do projecto, fornecendo os seus dados de contacto aos porta-vozes da AISA, (ver capa). O registo garante que receberá informações contínuas acerca do processo da AISA, incluindo convites para reuniões, actualizações do projecto e convites para participar na revisão dos relatórios preliminares.

Por favor, preencha o ***Formulário de Registo & Comentários*** em anexo e envie-o para o contacto que é facultado na capa.

# PROPOSTA DE PROJECTO HIDROELÉCTRICO BAYNES

# FORMULÁRIO DE REGISTO & COMENTÁRIOS

*Por favor, registem-me como Interessado e Parte Afectada, a fim de receber informações contínuas acerca da Avaliação do Impacto Sócio-ambiental (AISA) e do projecto proposto::*

| | |
|---|---|
| Nome: | Telefone: |
| Organização: | Fax: |
| Designação: | E-mail: |
| Morada: | |
| | |
| Comentários e motivos de preocupação: | |

*Por favor, envie o **Formulário de Registo & Comentários** para:*


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P.O. Box 20837
Windhoek
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