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# PREFEASIBILITY STUDY FOR BIOMASS POWER PLANT, NAMIBIA

## SOCIAL IMPACT SCREENING ASSESSMENT







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2012/07/31

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# Executive Summary

## Introduction

The objective of the social impact screening assessment was to identify the high level socio-economic impacts of the proposed Encroacher Bush to Power (EBtP) plant and to inform the development of the Environmental and Social Impact Assessment (ESIA) in line with IFC standards.

The social screening exercise aims to:

- Contextualise the socio-economic environment of the proposed project locations;
- Identify and evaluate socio-economic risks and impacts of the project; and
- Highlight the key areas of focus for further study and gap analysis.

Three potential project locations have been identified as possible power plant site locations, excluding the torrefaction scenario<sup>1</sup>. The technology type identified includes direct combustion of biomass to produce power. The three main scenarios are summarised in the table below.

Scenario	Electrical Output	Project Location	Brief Project Description
1	5MW	Otjiwarongo Town, Otjozondupa District, (approximate coordinates: 20°27'36.82"S 16°38'8.34"E)	Development of a small scale (5MW) combustion facility in Otjiwarongo. The harvested biomass would be supplied on contract basis by the Cheetah Conservation fund (CCF) situated 40km west of Otjiwarongo and transported to the combustion facility which is likely to be situated within the Industrial zone of Otjiwarongo town.
2a,2b	20MW	Ohorongo Cement, near Otavi, Otjozondjupa Region (approximate coordinates: 19°30'53.68"S 17°38'17.83"E)	Partnership with Ohorongo Cement and subsidiary harvesting operators (Energy For Future). Power plant to be situated on the cement plant footprint and feed directly into the cement facility.
2c,2d	20MW	Otjikoto Substation, near Tsumeb, Oshikoto Region (approximate coordinates: 19°13'14.23"S 17°38'17.20"E)	Assumed to be independent although possible partnership with Ohorongo Cement and subsidiary harvesting operators (Energy For Future) cannot be ruled out. Plant to be situated adjacent to the substation.

The report reviews applicable Namibian legislation as well as International Finance Corporation standards, which are likely to be applicable due to the probable sourcing of international development agency financing for the proposed project. There are eight IFC Performance Standards of interest from an ESIA perspective, with six of the performance standards being of particular relevance to the social aspects of the study.

## Findings

The potential socio-economic benefits and impacts have been assessed for the various scenarios in view of their differing locations and circumstances. Positive outcomes expected to occur include:

- Labour Creation:

All locations are characterised by significant levels of unemployment, especially for unskilled and semi-skilled workers. Similarly, all the scenarios are expected to generate employment opportunities. Employment associated with the harvesting and supply chain component is around 50 jobs for all scenarios, however only the CCF scenario is expected to generate a significant number of job opportunities for unqualified workers (32 jobs versus zero for the more heavily mechanised options). Between 27 and 33 additional jobs are expected to

<sup>1</sup> As identified in the environmental screening the torrefaction scenario will not require environmental or social assessment since this scenario would work on a contract supply basis.

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be created at the power plant itself. The number of jobs associated with the smaller 5 MW facility (scenario 1) is almost the same as that for the larger power plants.

■ **Local Economic Development:**

The EBtP plant is likely to bring an influx of skills and economic growth into the local area, which could have a positive knock on benefits to the local communities and the local economy. This may include a diversification and growth of the existing service and amenity industry could include provision of housing, accommodation, supermarkets, restaurants and ancillary services. The proposed upper limit of 2x10MW systems also provide the opportunity for a somewhat decentralised energy network to be developed. This can be expected to provide various socio-economic positives, namely by ensuring a broader geographic distribution of employment as well as more reliable supply of electricity. The economic benefit derived from indirect opportunities (i.e. indirect job creation) has not been quantified.

■ **Skills Provision:**

The operation of a large scale biomass to energy project offers an advantage of up skilling and training of workers and community members. Necessary training and skills sets for various job roles at differing skills levels will include engineering, bush harvesting, machinery operation, administration, health and security services. It is noted that CCF has mooted the possibility of establishing a “harvesting school” as part of its programme to up-skill unqualified workers.

■ **Commercial Farming – Economic Benefits**

A study by the Namibian Meat Board has determined that bush encroachment is the single most important obstacle towards the development of the country’s meat sector. One study reviewed during the course of the socio-economic screening indicated that, based upon an estimate of 12 million hectares of commercial farmland being severely bush encroached, around N\$ 600 million of earnings is forgone on an annual basis (at an assumed rate of N\$ 50 lost earnings per ha encroached). If combined with the N\$ 170 million per year that commercial farmers spend in de-bushing, the total loss for Namibia’s commercial sector due to bush encroachment is estimated at roughly N\$ 770 million per year or the equivalent to 1.5% of GDP. This has a direct impact to the more than 6,000 commercial farmers, 35,000 workers and around 140,000 dependants on commercial rangeland farming activity.

Considering that annual harvesting rates vary from around 4,500 ha/annum (for Scenario 1) to around 10,500 ha/annum (for the various Scenario 2 sub-cases), this should translate into an additional N\$ 225,000 – N\$ 525,000 increased additional earnings for the first year (at N\$ 50 per ha, and assuming that the extra revenue is generated immediately), increasing to N\$ 5.6 million per annum in the 25<sup>th</sup> year of operation (for Scenario 1) and N\$ 13 million per annum (for the various Scenario 2 options)

Over the 25 year lifespan of the proposed power plants, the debushing should result in a cumulative benefit in the order of N\$ 73 million (Scenario 1) and N\$ 170 million (Scenario 2) of additional revenue. These numbers are, of course, only rough estimates and are based on the assumption that all the cleared land is kept free of encroacher bush post-harvesting.

■ **Communal Farming – Economic Benefits:**

Encroacher bush are acknowledged to have negative impacts on the communal farming sector as well. However the impacts are different (due to the differing nature of land use) and do not appear to have been investigated as extensively, and have yet to be quantified to the same extent as for the commercial farming sector. Bush encroachment has been linked to substantial losses in communal farm productivity as well as water losses, resulting in lower food security and nutrition. While at present the debushing activities are anticipated to focus on commercial farming land (for commercial feasibility reasons), it is hoped that the project can be expanded to communal farmland in future. In this regard, it is possible that the CCF harvesting approach (which is more labour intensive and which includes a focus on skills development) may be more flexible for expanding into the communal farming sector in future.

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- **Water and Improved Socio-economic Resilience:**

While water is fundamentally an “environmental” issue, the importance of water in a country such as Namibia cannot be underestimated. Bush encroachment decreases the water-use efficiency of land and dries up water tables which induces desertification and creates bush induced artificial droughts, both of which can lead to serious socio-economic hardship. The impact of encroacher bush on water availability is a serious issue for both the commercial and communal farming sectors and may potentially have broader socio-economic impacts that reach beyond farming into other sectors of the economy (i.e. via reduced long term replenishment of aquifers).

- **Reduced Energy Imports / Improved National Balance of Payments:**

An EBtP facility has the potential to provide a comprehensive energy self-sufficiency solution as the fuel source will be local, providing a potential benefit in the form of reduced energy import and improved national balance of payments (typically a critical economic parameter for developing countries such as Namibia), as the biomass will displace the importing of energy, whether in the form of purchased electricity, coal product, diesel or similar. If the marginal electricity displaced is assumed to be imported electricity from Eskom, the imports avoided are estimated at around N\$ 65 million per annum (for a 20 MW EBtP facility and using the average cost for NamPower’s electricity supply mix as a proxy for Eskom tariffs).

Possible negative socio-economic impacts that may need to be evaluated further include:

- **Loss of land-utilisation and resources:**

The harvesting of biomass may disturb or displace existing land-uses within these farms, in particular utilisation of land for charcoal production. It is estimated that there are around 4,800 small scale charcoal producers operating in Namibia. The impact on charcoal makers will need to be considered in greater detail as part of any ESIA.

- **Relocation of farm tenants**

Whilst it is unlikely that it will be necessary to relocate farm tenants, this will be dependent on the final siting of the power plant and the harvesting footprint.

- **Occupational Health & Safety**

The activities associated with harvesting and combustion of biomass brings inevitable health and safety risks in the work place. These health and safety risks will need to be developed and enforced as part of the project. This requirement may mitigate against the full outsourcing of harvesting operations to a subcontractor (and hence affording lower control of health & safety standards) unless undertaken by a reputable contractor (i.e. the CCF, who already operate a FSC compliant harvesting operation) and appropriately monitored.

- **Community Health**

The requirement for a large number of labourers, as well as the potentially remote location of the harvesting operations may result in worker’s living separated from their families, away from their normal social network. The individuals, and worker communities, often have high vulnerability to a number of social and health implications. The main concerns include alcohol abuse as well as the spread of communicable diseases, in particularly sexually transmitted disease such as HIV/AIDS.

- **Increased traffic**

The transport of biomass between the feedstock areas and the combustion power plant will result in an increase of heavy vehicle traffic on the roads. The Increase in traffic is likely to be primarily on farm roads and may cause disturbance in terms of elevated dust levels as well as potential increase in incidents and accidents

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involving pedestrians and possibly cattle. In some instances, further investment in road infrastructure may be needed (i.e. for Otjiwarongo under Scenario 1).

None of the above (negative) socio-economic impacts are considered to represent a “fatal flaw” in the project viability.

### **Public Participation**

An extensive public participation (stakeholder engagement) process will need to be carried out during the environmental authorisation process. Preliminary stakeholder identification for each scenario has been undertaken and is summarised in the report.

### **Conclusions and Recommendations**

The project falls in line with national and local development priorities in each of the site locations, serving to provide employment opportunities, skills development, local economic growth and importantly an improvement in the agricultural carrying capacity of the farmland where encroacher bush is harvested. The economic benefits of improved carrying capacity of land is likely to lead to both an improvement in local economic strength, as well as the increased capacity (resilience) of communities to cope with environmental stresses.

The report outlines the potential socio- economic impacts (both positive and negative) for further analysis during the scoping phase of any ESIA, should the project proceed beyond the current pre-feasibility stage.



# 1 Introduction

The requirement for an Environmental and Social Impact Assessment (ESIA) was identified in the Environmental Screening Report for the NamPower Encroacher Bush to Power (EBtP) Plant Prefeasibility Study.

The objective of the social impact screening assessment was to identify the high level socio-economic impacts of the proposed biomass to power plant to inform development of the ESIA in line with IFC standards. The social screening exercise aimed to:

- Contextualise the socio-economic environment of the proposed project locations;
- Identify and evaluate socio-economic risks and impacts of the project; and
- Highlight the key areas of focus for further study and gap analysis.

# 2 Background

Three potential project locations have been identified as possible power plant site locations, excluding the torrefaction scenario<sup>2</sup>. The technology type identified includes direct combustion of biomass to produce power. The three main scenarios (as outlined in detail in the Environmental Screening report) are summarised in Table 1. The locations of the possible site locations are illustrated in Figure 1.

Table 1 Summary of scenarios

Scenario	Electrical Output	Project Location	Brief Project Description
1	5MW	Otjiwarongo Town, Otjozondupa District, (approximate coordinates: 20°27'36.82"S 16°38'8.34"E)	Development of a small scale (5MW) combustion facility in Otjiwarongo. The harvested biomass would be supplied on contract basis by the Cheetah Conservation fund (CCF) situated 40km west of Otjiwarongo and transported to the combustion facility which is likely to be situated within the Industrial zone of Otjiwarongo town.
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# 3 Methodology

The objective of the social impact screening was to identify the social issues associated with the project in the context of the locations and recommend ways in which the positive aspects can be enhanced and the negative impacts mitigated. The methodology for the social impact screening exercise included:

- Desktop Review and development of a social and socio-economic profile for each site:

<sup>2</sup> As identified in the environmental screening the torrefaction scenario will not require environmental or social assessment since this scenario would work on a contract supply basis.

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- Regional socio-economic context (macro-economic stats, un/employment, industry sectors, population, health, major economic centres, population demographics, etc.)
  - Local socio-economic context – local socio-economic stats (as far as possible) – industry sectors, population & demographics, access to services, etc.
  - Site context – a description of the people/land ownership/communities on and adjacent to the site, including income levels, demographics, etc.
  - Site visit (June 2012) and ground-truthing including some stakeholder engagement with local town councillors.
  - Identify potential social impacts and highlight potential social sensitivities resulting from the project to guide the development of further research and the scoping exercise.

## 4 Relevant Acts, Policies and Guidelines

### 4.1 National Legislation and Policies

#### 4.1.1 The Labour Act (No. 11 of 2007)

Line Ministry: Ministry of Labour and Social Welfare

The Act aims to “promote and maintain the welfare of the people and ... to further a policy of labour relations conducive to economic growth, stability and productivity”. It details basic conditions of employment, and health, safety and welfare requirements of employers.

The overriding target of the Labour Act is to regulate the relationship between employer and employee and to protect the worker against unfair discrimination, and also to attempt to ensure equitable labour relationships.

The Labour Act stipulates conditions for labourers regarding overtime, meal times, leave, remuneration, severance pay among others.

#### 4.1.2 National Planning Commission – Vision 2030

The Namibian Government has adopted a five year development plan scheme to ensure effective decision making. The current National Development Plan (NDP-3) runs from 2007/8 – 2011/12, presents a vision for the future course of development up until the time of the target year 2030. The predominant theme of NDP-3 (2030 Vision) is the accelerated economic growth through intensified rural development, while the productive utilisation of natural resources and environmental conservation are key result areas. Chapter 5 of Vision 2030 states the following: “*The integrity of vital ecological processes, natural habitats and wild species throughout Namibia is maintained whilst significantly supporting national socio-economic development through sustainable low-impact, consumptive and non-consumptive uses, as well as providing diversity for rural and urban livelihoods.*” Principal environmental concerns include water, land, marine, natural resources, biodiversity and ecosystems, drought, and climate change. Waste management and pollution will grow significantly with increasing industrialisation.

NDP-3 recognises that with the country’s scarce and fragile natural resource base, the risk of overexploitation is considerable, and that sustained growth is highly dependent on the sound management of these resources. The recently released National Development Plan, NDP- 4 (2012 – 2017) continues to focus on three major components **Income inequality**, together with **job creation** and **economic growth**. During the NDP-4 cycle, the following sectors are to be priorities: manufacturing, logistics, agriculture and tourism.

Agriculture is recognised as the backbone of the Namibian economy, NDP-4 will continue to focus on this sector, with the desired outcome of a growth in agricultural output (a target of 4% average real growth).

## 4.2 International Lender Policy and Guidelines

### 4.2.1 International Finance Corporation Performance Standards

The International Finance Corporation (IFC) released a Sustainability Policy and set of Performance Standards on Social and Environmental Sustainability (in force from July 2006, latest Version 1 January 2012) provide a benchmark for best practice as a safeguard for investment.

The environmental screening identified the need for an environmental and social impact assessment process (ESIA). Should NamPower proceed with the development of the project the ESIA will be required to confirm to IFC standards in the event that donor funding is required.

There are eight IFC Performance Standards (Table 2). Of particular relevance to the social aspects of the study are the performance standards 1, 2, 3, 5, 7 and 8. The performance standards outline the applicability and scope of assessment or planning required.

**Table 2. IFC Performance standards**

Performance Standard	Action Plan if Applicable
<b>1. Social and environmental assessment and management system</b>	An environmental and social impact assessment must be completed to assess environmental and social impacts both adverse and beneficial in the project's area of influence and to avoid or where avoidance is not possible, minimise, mitigate or compensate for adverse impacts on workers, affected communities and the environment. Affected communities will continue to be engaged on issues could potentially affect them through the <b>formal stakeholder engagement process</b> .
<b>2. Labour and working conditions</b>	<b>A Labour Plan</b> will be established during the ESIA phase to promote the fair treatment of workers and compliance with national labour laws.
<b>3. Pollution Prevention and abatement</b>	Various specialist studies will be employed during the ESIA phase depending on site and technology specific factors in order to identify and minimise adverse impacts on human health and the environment, and promote the reduction of emissions that contribute to climate change
<b>4. Community health and safety</b>	<b>A Health and Safety Assessment</b> will be completed in the ESIA phase to identify and minimise impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. This would include components such as a HIV prevention plan, among others.
<b>5. Land acquisition and involuntary resettlement</b>	Should involuntary resettlement (replacement of livelihood or loss of shelter) be occur as a result of the project <b>Land Acquisition and Resettlement Plan</b> will be formulated during the EIA phase to minimise the adverse social and economic implications of the project on displaced communities, ensuring that resettlement is accompanied by the appropriate compensation which ultimately improves or restores the livelihood of the resettled individuals.
<b>6. Conservation, Biodiversity and Natural Resource Management</b>	Projects located in modified, natural and critical habitats or that potentially affect ecosystem services will undergo a biodiversity impact assessment will be undertaken during the EIA phase of the project to

	identify species that require protection and conservation.
<b>7. Indigenous peoples</b>	Where communities of Indigenous Peoples are affected or impacted by the project within the project's area of influence a <b>Community Development Study</b> must accompany the EIA process to anticipate potential adverse impacts of the project on communities of Indigenous peoples, and minimize and compensate for such impacts as well as to promote on on-going relationship based on a stakeholder engagement process. The study would entailed very detailed cultural and baseline information. <b>The outcome of the process would be an informed consent form the community with a plan for continued dialogue.</b>
<b>8. Cultural Heritage</b>	Where there is the potential for adverse impact on cultural heritage resources (tangible and non, i.e. landscapes) a heritage impact assessment and archaeological impact survey must be conducted to identify any sites of potential cultural and heritage significance in order to protect them from the adverse impacts of project activities.

#### 4.2.2 Forestry Stewardship Council Guidelines

Although it was identified that NamPower (or the IPP, but assumed to be NamPower for the purposes of this report) should not necessarily seek to obtain Forest Stewardship Council (FSC) certification, it is recommended that NamPower consider adherence to the FSC principles. The pertinent principle in terms of social health is Principle 4 which seeks to *"maintain and enhance the long-term social and economic well-being of forest workers and local communities, and; respect worker's rights in compliance with the International Labour Organisation (ILO)"*; Specifically, Principle 4 states that:-

- The communities within, or adjacent to, the forest management area should be given opportunities for employment, training, and other services.
- Forest management should meet or exceed all applicable laws and/or regulations covering health and safety of employees and their families.
- The rights of workers to organize and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organization (ILO).
- Management planning and operations shall incorporate the results of evaluations of social impact. Consultations shall be maintained with people and groups (both men and women) directly affected by management operations.
- Appropriate mechanisms shall be employed for resolving grievances and for providing fair compensation in the case of loss or damage affecting the legal or customary rights, property, resources, or livelihoods of local peoples. Measures shall be taken to avoid such loss or damage.

# 5 Socio Economic Profile

The following section presents a summary of the socio-economic profile of the site locations (Figure 1). Information used to develop the regional profiles was sourced from the latest census data (NPC, 2001) and existing social or social impact studies. Local (site specific) information was based primarily upon site visit observations and consultation with stakeholders.



Figure 1. Political map of Namibia showing possible site locations for proposed EBtP plant for scenarios 1, 2a & b and 2c & d.

## 5.1 Country Profile



Namibia gained independence in 1990, and inherited a well-functioning physical infrastructure, a market economy, rich natural resources, and a relatively strong public administration. The country is classified as a middle-income country, with a strong multiparty parliamentary democracy that delivers sound economic management, good governance, basic civic freedoms, and respect for human rights. Namibia is also a highly dualistic society, with extreme social and economic inequities. With a population of just over 2 million inhabitants and an area of 824, 116 km<sup>2</sup>, it has one of the lowest population densities per square kilometre. However the nation, largely dependent on natural resources for its economy is highly vulnerable to short and long term environmental shocks such as drought.

Whilst Namibia has made significant progress in addressing many development challenges, such as basic education, primary health care services, and access to safe water, challenges still persist. The unemployment rate has grown from 31% in the 2001 Census to 43%, according to the

National Labour Force Survey. Although Namibia's average per capita income of US\$4,820 places it in the World Bank's upper-middle income band, the average income distribution is among the most unequal in the world, with a Gini coefficient estimated at 0.6 by the latest (NPC, 2006) National Household Survey. It is estimated that 27.6% of the population is poor, including 13.8% of severely poor.

Namibia is ranked 120 out of 187 countries surveyed in the 2011 Human Development Report (UNDP, 2011). Although Namibia is on track to meet the Millennium Development Goals on education, environment and gender, the severity of the HIV/AIDS epidemic in the country epidemic is hampering efforts to meet MDG's 4,5 and 6.

The population is mainly rural and nearly two thirds of the population lives in the four northern regions. Namibia is frequently confronted with natural disasters such as floods and droughts.

The country is divided into 13 administrative regions and has a well-established network of road, rail, port facilities and modern telecommunication infrastructure.

**Table 2 National Development Indicators for Namibia (Source: World Development Indicators Database)**

2010 Development Indicators	
Population, total (millions)	2.3
Population growth (annual %)	1.8
GDP (current US\$) (billions)	11.1
GDP per capita (current US\$)	4,876
GDP growth (annual %)	6.6
Life expectancy at birth, total (years)	62.1
Mortality rate, infant (per 1,000 live births)	29.3
Literacy rate, youth female (% of females ages 15-24)	94.9
Prevalence of HIV, total (% of population ages 15-49)	13.1



## 5.2 Regional Socio-Economic Profile

The baseline information gathering for the regional socio-economic profiles for the selected site scenarios is presented in Table 3. The information was primarily sourced from the latest (2001) published census information. In most instances, difficulty was found in sourcing more up to date information at the regional scale. A census was carried out in late 2011, and will be used to inform the scoping stage of the ESIA.

**Table 3. Regional Socio-economic profile for EBtP proposed site locations.**

District	Otjozondjupa Region		Oshikoto Region	
Scenario	<b>Scenario 2a &amp; 2b</b> Cooperating institutions: Ohorongo Cement, Energy for Future	<b>Nearest Town: Otavi,</b> Coordinates: 19°30'53.68"S 17°38'17.83"E	<b>Scenario 2c &amp; 2d</b> Cooperating institutions: assumed to be none	<b>Nearest Town: Tsumeb,</b> Coordinates: 19°13'14.23"S 17°38'17.20"E
	<b>Scenario 1</b> Cooperating Institutions: Cheetah Conservation Fund	<b>Nearest Town: Otjiwarongo,</b> Coordinates: 20°27'36.82"S 16°38'8.34"E		
Description	<p>The Otjozondjupa region is located in the northern central area of Namibia and covers an area of 105,328 km<sup>2</sup>. In the east, Otjozondjupa borders the North-West District of Botswana. Domestically Otjozondjupa borders more regions than any other region of Namibia, borders are as follows: Omaheke in the southeast, Khomas to the south, Erongo in the southwest, Kunene to the northwest, Oshikoto in the north and Kavango in the northeast.</p> <p>Okahandja and Otjiwarongo are well known for cattle farming, while Otavi and Grootfontein districts, and to a lesser extent also Otjiwarongo, are the granary of Namibia. The region has the potential to establish industries connected with these farming activities as well as by-products thereof.</p>		<p>The Oshikoto Region which is located in northern region of Namibia covers an area of 26,607 km<sup>2</sup> and is one of only three regions without either a shoreline or a foreign border. It borders the districts of Ohangwena in the north; Okavango in the east; Otjozondjupa in the southeast; Kunene in the southwest; and Oshana in the west</p> <p>The northern part of the region is predominantly agricultural. The main crop grown in this area is mahangu (pearl millet). In the southern part the region, the main economic activities include cattle rearing and mining. Tsumeb is the capital of the region.</p>	
Population	The population of the Otjozondjupa region is approximately 135 384, this constitutes approximately 7.4% of the total Namibian population, mostly concentrated around the towns		The total population of the region is 161,007 this constitutes approximately 8.8% of the total Namibian population. There are slightly more women (53%) than men (47%) in the region. Only a small proportion of	

	<p>of Grootfontein and Otavi. There are fewer women (48%) than men (52%) in the region. 41% of the population live in urban areas. Over half the population (55%) are between the ages of 15 and 59 and 55% have never married. One third (33%) of all households are headed by women.</p> <p>The population density of the region is very low, with approximately 0.97 person per square kilometre and over 50% of the population living rurally.</p>	<p>the population (9%) live in urban areas with the majority of people (91%) residing in rural areas. Just under half of the population (47%) are between the ages of 15 and 59 and the majority (59%) have never married. Half of all households in the Oshikoto region are headed by women.</p> <p>The population density of the Oshikoto region is approximately 4.2 persons per square kilometre.</p>
<b>Education</b>	<p>There is a 67% literacy rate with more girls (66%) between the ages of 6 and 15 attending schools compared to boys (61%). In terms of schooling, 27% have no schooling, 43% have primary education and 18% have secondary education, and 13% tertiary education. The main languages spoken in homes in the region are Otjiherero languages (28%), Nama/Damara (22%) and Oshiwambo languages (20%). 32% of the labour force is unemployed, but this figure has not been disaggregated by sex (NPC, 2001).</p>	<p>There is an 83% literacy rate with more girls (87%) between the ages of 6 and 15 attending schools compared to boys (82%). Oshiwambo languages are spoken in the majority (87%) of homes in the region.</p>
<b>Income and Employment</b>	<p>The average per capita income in Namibia ranges from N\$22,500 in the Khomas region where the capital city of Windhoek is situated to around N\$4000 in the poorest regions of Kavango and Ohkangwena. The average per capita income in the Otzondjupa district is N\$8,000. (NPC, 2006) The industry in the region is dominated by mining (Copper, Zinc, Silver, Germanium, Lithium, Manganese and semi-precious stones) but the region is also strong on crop and livestock farming. The region has a 30.6% unemployment rate, showing a slight decline from the 2001 data (32%). Only a very small proportion (4.9%) of the population relies on subsistence farming, and the majority (54%) of the population are salary earners (NPC, 2008).</p>	<p>The average per capita income in the Oshikoto District is N\$5,000. The region is characterised by a dualistic economy, with a strong formal business and commercial agriculture sector on the one hand and an under developed communal subsistence agriculture (49.6% of population rely on subsistence farming) and informal business sector on the other. Overall farming dominates as the main source of income (commercial and subsistence) in the region. Discussions with the CEO of the town council reveal that there are over 200 commercial farms in the region. Bush encroachment is reported to be a major limiting factor to the agricultural output in the area. The latest employment figures indicate that Namibia has an unemployment rate of 43%. The unemployment rate in the Oshikoto region was 68%, the highest unemployment rate nationally (NPC, 2008).</p> <p>The heart of the wealth in the region is in Tsumeb. Largely thanks to the copper mining industry and cement operations (Ohorongo Cement) near Otavi. The smelters and Ohorongo are the largest employers in the region and there has been an influx into the region to seek work.</p>
<b>Housing Services &amp; Amenity</b>	<p>It is estimated that around 94% of households in the region have access to safe water, and 43% have no toilet sanitation facility. Only 42% have access to electricity for lighting, while 60% use wood/charcoal for cooking (NPC, 2001).</p>	<p>The most common type of dwelling in the region is the traditional dwellings (75%). Overall, 88% of households in the region have access to safe water, but the majority of households (70%) have no toilet facility and only 15% have access to electricity for lighting, while 84% use wood/charcoal for cooking (NPC, 2001).</p>



	<p>The Otjozondjupa region includes the local authorities of Grootfontein, Okahandja, Okakarara, Otavi and Otjiwarongo.</p>	<p>Tsumeb is the only local authority in the Oshikoto region.</p>
<p><b>Health &amp; HIV</b></p>	<p>Namibian Life expectancy at birth for males in 2004 was 52, slightly higher than the average for the rest of the WHO African region (47) (WHO, 2006). In the Otjozondjupa region, five diseases accounted for 46% of all deaths in government hospitals in Namibia during the period 1995 – 1999. The major diseases (with number of mortalities in brackets) were HIV/AIDS (280), Tuberculosis (218), Acute respiratory infections (198), Gastroenteritis (157), and Malaria (156) (Christian &amp; Associates, 2009). The HIV/AIDS infection rate in Namibia as a whole was 22% in 2000. This disease has important implications for employers as it mainly affects the age groups that are normally most economically productive.</p>	<p>The region suffers from a 25% rate of HIV/AIDS prevalence, which along with perinatal death, tuberculosis and malaria presents the biggest health risk to the population. The HIV/AIDS rate is slightly higher than the national average of 23.1% and very high in comparison to the WHO Africa average, being just 7.3% (WHO, 2006).</p>

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## 5.3 Local Socio-Economic Context

## 5.4 Scenario 2a & 2b: Ohorongo Cement

### 5.4.1 Description of settlements and nearby towns

The proposed encroacher bush to power plant site location is situated next to the Ohorongo Cement facility on Farm Sargberg, approximately 15km north-east from Otavi. The land surrounding Ohorongo is comprised of primarily large commercial farms, with an average size of over 3,300 ha. The land is used mainly for grazing purposes. Some farms are of marginal viability, largely due to bush encroachment and related loss of carrying capacity. The area surrounding Ohorongo has a very low population density of less than 1 person per square kilometre.

Ohorongo has very few near neighbours. There are a few families of farmers and farm labourers in the vicinity. The nearest homesteads are some 3km or more from the site (Christian & Associates, 2009).

The families living on Farm Sargberg are poor in financial terms but they were reported to enjoy a peaceful life on the farm. They have been co-existing with Ohorongo Cement for a number of years, so they are not expected to be affected further by the development. Furthermore, none of their dwellings are near to the proposed project location— so relocations will not be required. The only significant concentration of population is in Otavi more than 15km away. There are few farm homesteads (Tsobis) and a game lodge, but these are located over 5km away from the site. Business will likely only be affected positively by an increase in potential business.

The town is led by the Town Council, led by seven local authority councillors and a regional councillor. The key traditional leadership structures in the area were not established during the site visit.

### 5.4.2 Economic activities and services

Otavi is a quiet town, with little industrial development at present. Much of the town's economy relies on the Ohorongo Cement facility, as well as the two grocery stores, a mill, two banks, two gas stations, and many surrounding game and cattle farms, as well as a handful of other small business. The major employers are the local mill and the army base, while the surrounding lodges and farms also offer employment. Otavi still has demands to be met in the service and retail sector, most of the large retail chains and service providers are well established in Tsumeb and Otjiwarongo and therefore most residents and large business (army base, Ohorongo Cement and the mill) prefer to source goods and services from the bigger towns

The Ohorongo Community Development Trust Fund has been very instrumental in the development of the town, establishing a medical centre and assisting to upgrade the soccer field, whilst also supplying medical equipment and medicine to the centre.

### 5.4.3 Local municipal development priorities

Consultation with the Otavi Town Council revealed that the major development priorities currently include employment and service provision. The town reportedly experiences a very high unemployment rate. Most of the employment in the town stems from the Cement facility. Due to the lack of job opportunities in the town, there has been an out flux of the younger population, as such the population of the town is largely elderly.

The Otavi Local Development Strategy indicates that many of the social challenges in Otavi are derived from the issue of poverty. The town has informal settlements mostly populated by abundant farm workers and people hoping to access work opportunities. Otavi Town is attempting to deliver formal accommodation, however the resources to do this have traditionally been limited. HIV/AIDS and social exclusion are listed as significant social problems within the town.

The town's local development plan aims to develop Otavi as an Industrial hub within Namibia, supported by its central location, and good transport connections to Windhoek. Problems exist however in a lack of basic amenities in the town (tarred roads, sanitation and electrical facilities) which are currently undergoing upgrades. Otavi Town Council has recently received funds to build an estimated number of 500 low cost houses to relocate residents from former single quarter structures where people are living in over-crowded, squalid conditions.

A number of new industrial developments are reportedly planned for the town; this includes the development of the Otavi Steel Mill and an abattoir. The steel mill is expected to bring in the region of 350 new jobs to the town and the development will include the opening of a technical/ industrial college to provide training for the mill and other industrial facilities in the area.

One of the major challenges identified for Otavi include expansion of the town to provide for additional housing an amenity, due to the fact that the town is landlocked by private farmland with extremely restrictive town boundaries. The town is currently undergoing a town boundary expansion exercise which will increase the boundary to just beyond the Ohorongo cement facility.



Figure 2. typical streets and infrastructure in Otavi

#### 5.4.4 Key stakeholders

Table 4 presents an initial inventory of key stakeholders have been identified as key groups of interested and affected parties<sup>3</sup> for further consultation in the public participation process as part of the SEIA.

Table 4. key stakeholders in Otavi area

Stakeholder	Description of interest
Otzojnodupa Regional Council, Ontjowarongo	Regional Council
Otavi Town Council	Town Council
Otavi Residents	Main settlement
Ohorongo Community Development Trust	Ohorongo Cement Development Trust
Tsobis Community	Small grouping of homesteads ~5km to north east of site
Otavi Farmers Union	Local farmers Union

<sup>3</sup> This is not an exhaustive list and will require further development

## 5.5 Scenario 2c and 2d: Tsumeb

### 5.5.1 Description of settlements and nearby towns

The proposed location of the EBtP plant is adjacent to the Otjikto substation, 6.5 kilometres north-west of the Town of Tsumeb. Tsumeb is the capital city of the Oshikoto region in northern Namibia and is the closest town to Etosha National Park, and is therefore a popular stop-off destination for tourists visiting the park.

The town of Tsumeb is home to approximately 15,000 inhabitants and the largest and most developed town in Oshikoto region in northern Namibia. The town is important economically for its unique geology, particularly copper, and home to The Tsumeb Smelter Complex (originally constructed in 1960, and now closed) and the Namibian Custom Smelter (NCS), which became operational in 2010. The closure of the old Tsumeb Smelter Corporation in 1998 resulted in a period of high unemployment in the town, but the situation has improved radically with the opening of the new smelter. The NCS is the largest employer in Tsumeb employing 400 individuals with a further 400 supply chain related jobs. News reports in the area highlight that the NCS has been under fire for exceedances of international guidelines in terms of air quality - predominantly sulphur dioxide, leading to a significant concerns from employees and town residents.

Other than the mining industry, the town is largely supported by commercial farming; Tsumeb is the core for mining and farming communities for a radius of approximately 100km. There are 105 commercial farms around Tsumeb.

The nearest residential dwelling to the substation is approximately 1.5 km east of the substation, consisting of a small holding. There is an informal housing settlement situated approximately 8 km south east of the substation on the south western border of the town.



Figure 3. informal housing settlement

### 5.5.2 Local municipal development priorities

Tsumeb is a comparably affluent town with a strong middle- high income constituent. Consultation with Tsumeb Municipality reveals that the primary development concerns within Tsumeb includes housing provision for

the growing population. Housing concerns primarily exist because much of the land surrounding the town is owned by the Tsumeb Corporation Smelter Limited, and this has constrained housing development expansion.

Continued and diversified employment for Tsumeb’s rapidly growing population remains a key priority although the levels of employment are high comparative to most of the nation. The Tsumeb 5 year Strategic Plan (2011) aims to place the town as the regional strategic hub for SME industry and to capitalise on the potential of the maize triangle to becoming the bread basket of the country. The Plan makes note of the fact that the town has been hard hit by unemployment exacerbated by an influx of people into the town. However with the envisaged reopening of the Weatherly International Mine, the extension and modernisation of the Namibia Custom Smelter, and the opening of businesses at the Le-Platz Shopping Complex, the second phase of another complex in close proximity, the envisaged Trade Fair Centre by the Ministry of Trade and Industry, the community market nearing completion the plan projects a swell in employment opportunities.

### 5.5.3 Community and services

Tsumeb is well served in terms of amenities and serves as an important centre for the Oshikoto Region (and neighbouring Otzondjupa Region) for schooling and health-care facilities. There is one private and one state hospital in town, plus four main clinics in and around Tsumeb. Many of the large retail chains are well established and the town is a major centre for retail in the area.

Tsumeb has a well-structured community system. The only municipal office of the Oshikoto Region is situated in Tsumeb. A Community Skills Development Centre (Cosdec Tsumeb) was established in 1998 in response to the high unemployment rate in the region, particularly in the wake of the closure of the old copper smelter. The development centre is community-owned, managed and administered and, targets out-of-school youth with technical training. Traditional leadership structures in the area were not identified.

### 5.5.4 Key stakeholders

Stakeholder	Description of interest
Office of the Town Clerk of Tsumeb	Local Council
Oshikoto Regional Council	Regional Council
Tsumeb Residents	Nearest Town
Namibian Agricultural Union	National Agriculture Union
Tsumeb Farmers Union	Farmers Union
Grootfontein/ Tsumeb/ Otavi Farmer’s Union	Farmers Union
Community Skills Development Centre	Community Centre

## 5.6 Scenario 1: Otjiwarongo

### 5.6.1 Description of settlements and nearby towns

Otjiwarongo is one of the oldest towns in Namibia, established in 1892. It is the capital of the Otjiwarongo electoral constituency and also the capital of Otzondjupa District. The town has a population of approximately 20,000 people. The land surrounding the town is predominately private farmland and game farms and lodges.

The proposed harvesting location for the EBtP plant is 40km to the east of Otjiwarongo, with the combustion facility likely to be in the Industrial zone of the town itself. From the site visit and aerial photographs the popula-

tion density in the harvesting area near the Cheetah Conservation Fund is extremely low. The nearest obvious sensitive receptors are two homesteads situated 17 and 29 km to the west of CCF respectively. A few farm workers are likely to live in the harvesting footprint however the operations should not result in disturbance or displacement.

A low-income housing is predominantly situated in the township area at the eastern edge of the town. The traditional leadership structures within the town are not understood at this point and will require further assessment. Around 90% of the town's residents speak Afrikaans, about 75% speaks English and 35% German. Other languages include indigenous languages like Otjiherero, Damara-nama and Oshiwambo.

### 5.6.2 Economic activities and services

The town has a strong industrial focus, particularly processing of leather products and textile raw materials including cotton and jute. The location of Otjiwarongo on the main road northwards from Windhoek means that it is a popular stop-off for tourists travelling northwards. Otjiwarongo also has a well-developed road network as well as an air strip. There are plans to develop an international airport. The trans-Caprivi highway also passes through Otjiwarongo. The railway line links other towns: Windhoek, Walvis Bay, Tsumeb and Oshikango. The roads are well maintained and mostly tarred. The retail industry thrives in Otjiwarongo with good amenity in the form of retail chains, small family owned business and industrial services.

The town is also well developed and endowed with good schooling and hospital resources. There are eleven schools within the town, five private schools and six public schools. Otjiwarongo State Hospital is the biggest hospital in the town; it is mostly used by the middle and low income residents. A number of private clinics and hospitals are also present in the town. The Cheetah Conservation Fund is one of the primary tourist attractions in the town.

### 5.6.3 Local municipal development priorities

Otjiwarongo is a comparatively affluent town with a strong middle- high income constituent. As is the case in much of Namibia, the wealth is polarised however, and there are the typical concerns surrounding employment for the burgeoning population within health concerns, particularly in the township areas. The majority of the low income population live in the large township situated at the eastern periphery of the town.

### 5.6.4 Key stakeholders

Stakeholder	Description of Interest
Otjozondjupa Regional Council	Regional Council
Otjiwarongo Residents	Local town residents
Otjiwarongo Community Development Centre	Community Centre
Namibian Agricultural Union	National Agriculture Union
Otjiwarongo Farmer`s Union	Farmers Union
South Waterberg Farmer`s Union	Farmers Union



## 6 Potential Socio-Economic Impacts

### 6.1 Potential Positive Socio-Economic Impacts

The potential positive and negative socio-economic impacts associated with the project have been identified in order guide the scoping assessment once the final site has been identified. In addition, potential community sensitivities to the development have been highlighted.

#### 6.1.1 Provision of labour

One of the most significant impacts associated with the project will be provision of job opportunities. The income provided will help to reduce workers vulnerability to poverty and, by diversifying livelihoods, make them less susceptible to the vulnerabilities associated with traditional subsistence farming products and need for income supplementation.

The labour requirement resulting from the development of the combustion facility will be dependent on the final scenario chosen, however estimates for the labour requirement are provided in Table 5. The most labour intensive component of the project is likely to be as a result of bush harvesting. There will be a high proportion of locally sourced manual labour. The more specialised roles will likely have to be outsourced from the local and regional areas.

**Table 5. Estimation of required labour complement**

Project Phase	Labour Type	Scenarios				
		1	2a	2b	2c	2d
		5MW Grate CCF	2 x 10MW Grate Ohorongu	2 x 10 MW BFB Ohorongu	2 x 10MW Grate Otjikoto	2 x 10 MW BFB Otjikoto
Supply Chain	unqualified worker	32	0	0	0	0
	semi-skilled worker	8	30	28	30	30
	highly trained worker	3	7	6	7	7
	maintenance crew	5	10	10	10	10
	maintenance engineer	1	2	2	2	2
	head of harvesting	1	1	1	1	1
<b>Total: harvesting &amp; supply</b>		<b>50</b>	<b>50</b>	<b>47</b>	<b>50</b>	<b>50</b>
Combustion Plant	Plant manager	1	1	1	1	1
	Plant operators	5	6	6	6	6
	Maintenance supervisor	3	3	3	3	3
	Maintenance staff, fitters, electrical	8	10	10	10	10
	Labourer	10	13	13	13	13
<b>Total: plant</b>		<b>27</b>	<b>33</b>	<b>33</b>	<b>33</b>	<b>33</b>
<b>Total Est. Required Labour Compliment</b>		<b>77</b>	<b>83</b>	<b>80</b>	<b>83</b>	<b>83</b>

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Ultimately, this type of project will be likely to prove more beneficial for the male workforce, particularly the supply chain components. Socio-economic analysis in the SEA for bush to energy (Christian & Associates, 2010) indicates that in the charcoal industry, cutting and burning is done almost exclusively by men and the work can be extremely physically taxing.

The use of manual harvesting techniques would improve the employment provision. However the use of full manual harvesting has been ruled out for the following reasons:

- Speed/ scale of harvesting faster with mechanised harvesting techniques; and
- Concerns from landowners (farmers) in having large numbers of migrant labourers on their farms. Major concerns include stock theft, equipment theft, poaching, and disruptions amongst their established staff, alcohol-related problems and security issues.
- In interviews carried out by Christian & Associates (2010) there was noted to be general agreement amongst interviewed farmers and workshop participants that rural residents are also reluctant to do manual bush-cutting work.

Due to the physical nature of the work involved, employment opportunities for women are likely to be limited to the activities associated with the combustion facility.

**Recommendations:**

A Labour Plan will be required as part of the ESIA process. The objective of the plan will be to:

- Promote the fair treatment, non-discrimination and equal opportunity of workers.
- To establish, maintain and improve the worker management relationship;
- To promote compliance with national labour laws to protect workers, including vulnerable categories of workers such as children.

### 6.1.2 Local Economic Development

The EBtP plant is likely to bring an influx of skills and economic growth into the local area, which could have a positive knock on benefits to the local communities and the local economy. This may include a diversification and growth of the existing service and amenity industry could include provision of housing, accommodation, supermarkets, restaurants and ancillary services. The proposed upper limit of 2x10MW systems also provide the opportunity for a somewhat decentralised energy network to be developed. This can be expected to provide various socio-economic positives, namely by ensuring a broader geographic distribution of employment as well as more reliable supply of electricity.

**Recommendations:**

Analysis during the ESIA phase of the likely knock-on impacts associated with the EBtP plant in terms of opportunities, constraints and risks associated with development should be explored in order to maximise local economic development and mitigate against any potential negative impacts.

### 6.1.3 Skills provision

The operation of a large scale biomass to energy project offers an advantage of up skilling and training of workers and community members. Necessary training and skills sets for various job roles at differing skills levels will include:

- Engineering – machine maintenance/ operation/ optimisation, waste management, reporting.
- Harvesting – machinery handling and maintenance, biodiversity/ rangeland, heavy vehicle training
- Administration – book keeping, financial management,
- Health – health and safety, first aid.
- Security services



### **Recommendations:**

Commitment to skills provision and training to be considered in Labour Plan for inclusion in the ESIA.

#### **6.1.4 Economic Benefits – Commercial Farms**

A study by the Namibian Meat Board has determined that bush encroachment is the single most important obstacle towards the development of the country's meat sector (Chiriboga *et al*). The encroacher bush is known to have a significant negative effect on commercial cattle farming in Namibia, by reducing the carrying capacity of the land (i.e. less grass production resulting in lower ability to support cattle per ha of farm – see Table 6). The carrying capacity of a field free of bush encroachment is almost 27 times higher than a field that is 100% infested. The loss of grassland and the incidence of bush-induced drought lead to a decline in the carrying capacity of land and thus make livestock production more challenging and expensive.

Several studies have been carried out to assess the impacts of bush clearing on commercial rangeland. Most studies in the area of carrying capacity of land in Namibia have determined that a debused hectare of land can produce an average of N\$ 50 more than one suffering from bush encroachment (Chiriboga *et al*). The CBEND project estimated the financial benefits of increased production for a hypothetical encroached farm of 5,000 ha in central Namibia to be even higher. The study concluded that thinning can add an increasing amount to the gross income from cattle farming, growing every year with the increased area that is thinned, to approximately N\$500,000 (per annum presumably) after 10 years once the whole farm has had one thinning treatment (Baldiga *et al*, 2008).

A further study, undertaken by Chiriboga *et al* in 2008, assessed the economic relationship between bush encroachment and the cattle sector in greater detail. The study noted that:

*“Historically, the feeding of cattle has not been a costly endeavour for Namibian farmers thanks to the country's sprawling grasslands. Bush encroachment and desertification, however, have taken their toll in recent years, slowly destroying the savannahs in Namibia. With the country's grasslands slowly shrinking, the most likely cattle food alternative available to Namibian farmers is cattle fodder, which can either be produced locally or imported from abroad. Unfortunately, the production and importation of cattle fodder are costly. As of 1997, only 1% of Namibia's land surface had the nutrients and the water-holding capacity necessary for rain-fed and irrigated crop production (National Drought Task Force). Producing yellow maize, a crop which constitutes 50% of the ingredients found in cattle fodder (Olivier), is therefore a costly process in Namibia”*

The study made the following points:

- Bush encroachment is resulting in lower carrying capacity of the land for cattle farming.
- This is resulting in:
  - Increased demand for already expensive cattle fodder (i.e. maize) to feed animals.
  - Less mature cattle being raised in Namibia.
  - Instead, cattle are being weaned and exported while still young (e.g. to South Africa), at a lower overall economic benefit to the country than if mature cattle had been raised.

**Table 6: Effect of Bush Encroachment on Carrying Capacity (Chiriboga *et al*, 2008).**

Site	Treatment (bushes left) per hectare	Hectare per large stock unit
Pontdrif (1991/92) 214mm	0%	9.9
	20%	29.4
	50%	128.9
	100%	267.4

<b>Pontdrif (1991/92) 440mm</b>	0%	9.4
	20%	12.3
	50%	25.5
	100%	81.7

The study indicated that most debushing programs in Namibia are undertaken manually (at present) as it is more cost-effective than the aerial application of chemicals or demolishing by bulldozing, notwithstanding that this approach is clearly not winning the battle (at a national level) against bush encroachment. Effective debushing for an average commercial farm is estimated to require the hiring of 4 full-time workers, each capable of debushing an area of 47 hectares per year. Additionally, each worker would need to earn an average of N\$ 600 per month (as estimated in 2008) to make the salaries competitive, which adds to N\$ 28,800 per year or N\$ 3.6 per hectare (according to the National Agricultural Union). This is just slightly higher than the figure provided by the Karstveld Study Group which estimated a spend of N\$ 26,000 on de-bushing per year, representing 7% of an average farm's total costs. The N\$ 28,800 translates into 188 ha of cleared land per annum at a cost of \$153 per ha per annum.

This suggests that a farmer would be willing to pay around N\$ 75,000 for mechanical harvesting of 500 ha in one year, which would provide the farmer with a quicker and simpler solution for clearing more land per annum at the same cost per hectare (simpler because the farmer does not have to deal with the management of labour nor with the problem of disposing the wood i.e. via charcoal production). Chiriboga *et al* provide an estimate of N\$ 170 million per annum of the current spend by commercial farmers on tackling bush encroachment nationally.

In reality, the ability and willingness of commercial farmers to spend on debushing will vary based on annual income and commercial performance for the year, any changes in the economics of alternative treatment methods, as well as individual farmer profiles.

The rough estimate of the amount of commercial land that is severely bush encroached is 12 million hectares which means that N\$ 600 million of earnings is forgone in this land (at an assumed rate of N\$ 50 lost earnings per ha encroached). If combined with the N\$ 170 million per year that commercial farmers spend in de-bushing, the total loss for Namibia's commercial sector due to bush encroachment is estimated at roughly N\$ 770 million per year or the equivalent to 1.5% of GDP.

This has a direct impact to the more than 6,000 commercial farmers, 35,000 workers and around 140,000 dependants on commercial rangeland farming activity (Chiriboga *et al*).

### 6.1.5 Economic Benefits – Communal Farms

Encroacher bush are acknowledged to have negative impacts on the communal farming sector as well. However the impacts are different (due to the differing nature of land use) and do not appear to have been investigated as extensively, and have yet to be quantified to the same extent as for the commercial farming sector. Bush encroachment has been linked to substantial losses in communal farm productivity as well as water losses, resulting in lower food security and nutrition (Karuaera, 2011). While at present the debushing activities are anticipated to focus on commercial farming land (for commercial feasibility reasons), it is hoped that the project can be expanded to communal farmland in future.

### 6.1.6 Water and Improved Socio-economic Resilience

While water is, in effect, an "environmental" issue, the importance of water in a country such as Namibia cannot be underestimated. Bush encroachment decreases the water-use efficiency of land and dries up water tables which induces desertification and creates bush induced artificial droughts, both of which can lead to serious socio-economic hardship. For example, the evapotranspiration rate of certain bush types is 32,500 liters per day for every 500 trees – seven times higher than those of benign grassland used for feeding cattle (Chiriboga *et al*). The impact of encroacher bush on water availability is a serious issue for both the commercial and

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communal farming sectors and may potentially have broader socio-economic impacts that reach beyond farming into other sectors of the economy (i.e. via reduced long term replenishment of aquifers).

### 6.1.7 Reduced Energy Imports and National Balance of Payments

It is reportedly a national policy for Namibia to strive to become more energy self-sufficient. One of the options being considered to achieve this goal is via the construction of coal-fired power stations. However, in reality this only provides for partial self-sufficiency, as the coal will still need to be imported, at substantial cost in terms of currency outflows.

An EBtP facility has the potential to provide a more comprehensive energy self-sufficiency solution as the fuel source will be local. Beyond helping Namibia to achieve a national goal, there is also a clear benefit to the national balance of payments (typically a critical economic parameter for developing countries such as Namibia) as the biomass will displace the importing of energy, whether in the form of purchased electricity, coal product, diesel or similar. If the marginal electricity displaced is assumed to be imported electricity from Eskom, the imports avoided are estimated at around N\$ 65 million per annum (for a 20 MW EBtP facility and using the average cost for NamPower's electricity supply mix as a proxy for Eskom tariffs).

### 6.1.8 The CCF Approach to Harvesting

CCF has indicated a specific desire to be involved in the bush clearing process i.e. by establishing and running a harvesting operation. CCF sees numerous environmental benefits in terms of bush harvesting, not least in terms of habitat improvement for the Namibia cheetah. CCF has indicated an interest in broadening the socio-economic and environmental benefits should they be involved in large scale harvesting activities, by means of:

- The use of more environmental selective harvesting techniques;
- The use of more labour intensive harvesting techniques (by use of a mechanised harvester but use of labour for windrowing and chipping);
- Establishing a harvesting school to train individuals; and
- Engagement with communal farmers.

## 6.2 Potential Negative Socio- Economic Impacts

### 6.2.1 Loss of land-utilisation and resources

The encroacher bush biomass feedstock for the power plant will be sourced from private farmland. The actual footprint of the harvested material will be dependent on the agreements that can be reached between NamPower, cooperating organisations (e.g. CCF and Energy for Future) and the surrounding land owners. The harvesting of biomass may disturb or displace existing land-uses within these farms, in particular utilisation of land for charcoal production.

It is estimated that there are around 4,800 small scale charcoal producers operating in Namibia (Christian & Associates, 2010). Evidence of this was observed during site visit, there was evidence of people using the land near to the sites identified for small-scale charcoal production as well as firewood harvesting.



**Figure 4. (left) small scale charcoal production facility, (right) Ladies collecting firewood for cooking and heating**

**Recommendations:**

During the scoping phase of the ESIA, further assessment will be required to determine the impact of the development on existing land-users - although the extent of such land-uses is not likely to be significant in scale since the harvesting land under consideration is private farmland. Should the development preclude or impact upon the existing livelihood of a person or group of persons a plan will need to be developed (as per IFC Performance Standard 5) to achieve the following outcomes:

- To avoid, and when avoidance is not possible, minimise displacement by exploring other project designs.
- To ultimately, improve, or restore the livelihoods of displaced persons

The scope of application of this performance standard includes:

- Land rights or land use rights acquired through expropriation or other compulsory procedures in accordance with the legal system of the host country.
- Land rights acquired through negotiated settlement agreements with property owners
- Project situations where involuntary restrictions on land-use access to natural resources cause a community or groups within a community to lose access to resource usage where they have traditional or recognisable land use rights.

### 6.2.2 Relocation of farm tenants

Whilst it is unlikely that it will be necessary to relocate farm tenants, this will be dependent on the final siting of the power plant and the harvesting footprint.

**Recommendation**

Relocation of farm tenants as a result of the project is to be avoided. In the unlikely event that relocation is required a detailed Resettlement Plan will need to be developed as per Performance Standard 5 of the IFC.

### 6.2.3 Occupational Health & Safety

The activities associated with harvesting and combustion of biomass brings inevitable health and safety risks in the work place. These health and safety risks were assessed in the environmental screening report. Health and safety risks which include; working with heavy machinery, risk to injury (e.g. cuts and snake bites), fire, environmental exposure (e.g. heat stroke) and handling of hazardous chemicals will be managed through an environmental and social management plan throughout all phases of the project (construction, operation and

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decommissioning). The plan will detail specific requirements for training and use of protective equipment specifications as well as emergency and reporting guideline procedures.

### **Recommendations**

In terms of occupational health and safety, project developers will also be required to prove that the plant and harvesting operations comply with OHS specifications as detailed by the IFC EHS guidelines. The IFC guidelines explicitly state that the scope of this assessment is also to include supply chain operations.

Health and safety of labour in the workplace will be assessed in the Labour Plan developed as part of Performance Standard 2, and health and safety of the community outside of the boundaries of the development will be assessed in the community health and safety plan will be required as part of the ESIA to assess potential risks and mitigations in routine and non-routine circumstances.

## 6.2.4 Community Health

The requirement for a large number of labourers, as well as the potentially remote location of the harvesting operations may result in worker's living separated from their families, away from their normal social network. The individuals, and worker communities, often have high vulnerability to a number of social and health implications. The main concerns include alcohol abuse as well as the spread of communicable diseases, in particularly sexually transmitted disease such as HIV/AIDS.

### **Recommendations**

Community health issues can potentially be exacerbated by a lack of healthcare and ancillary support facilities in the nearby area. Nampower (as the project developer) should ensure that staff have adequate access to these facilities, and provide HIV/AIDS education to workers and families on a regular basis.

A Community Health and Safety Assessment should be completed in the EIA phase in recognition of Performance Standard 4 (Community, health, safety and security) to identify and minimise impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances. Such aspects of the study include a HIV prevention and management plan.

## 6.2.5 Increased traffic

The transport of biomass between the feedstock areas and the combustion power plant will result in an increase of heavy vehicle traffic on the roads. The Increase in traffic is likely to be primarily on farm roads and may cause disturbance in terms of elevated dust levels as well as potential increase in incidents and accidents involving pedestrians and possibly cattle. In some instances, further investment in road infrastructure may be needed.

### **Recommendations**

The final siting and scenario will determine the scale and severity of traffic impacts in the scoping assessment of the ESIA. If determined necessary a specialist assessment will be carried out to determine the most feasible options to minimise, or avoid traffic impacts on any sensitive receptors identified.

# 7 Public Participation Process and ESIA

An extensive public participation (stakeholder engagement) process will need to be carried out during the environmental authorisation process. Stakeholder engagement is the key process for managing two way communications between the project developer and the public and local communities. The engagement plays a critical role in terms of improving decision making and promoting understanding and support for the project through the active engagement of individuals, groups and organisations that have a stake in the project and its outcomes.

Through this process the developer is able to raise awareness of a project's impacts and gaining agreement on management and technical approaches in order to maximise benefits and reduce negative consequences.

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For NamPower, consulting affected parties early and frequently throughout the development process will not only be a key component of the ESIA process, but a thorough process also makes good business sense and in many cases can lead to reduced financial risks and delays, a positive public perception.

## 8 Gap Analysis and Conclusions

The project falls in line with national and local development priorities in each of the site locations, serving to provide employment opportunities, skills development, local economic growth and importantly an improvement in the agricultural carrying capacity of the farmland where encroacher bush is harvested. The economic benefits of improved carrying capacity of land is likely to lead to both an improvement in local economic strength, as well as the increased capacity (resilience) of communities to cope with environmental stresses.

The report outlines the potential socio- economic impacts (both positive and negative) for further analysis during the scoping phase. Due to limitations in the understanding of final project scenario and harvesting area, a number of gaps in the knowledge still exist however which will require further assessment. These include:

- Finalisation of combustion site location, and potentially impacted communities;
- Finalisation of harvesting footprint location, and extent and vulnerability of potentially impacted communities;
- Infield analysis of communities within development footprint including existing social, cultural uses of land, and analysis of the sensitivity of the local communities to labour influx and environmental disturbances;
- Examination of existing skills base;
- Establishment of options for employment sourcing and accommodation; and
- In depth assessment of economic opportunities and knock on effect within the local economy and community resilience associated with the EBtP facility and bush clearing activities.

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