

**SOCIAL IMPACT ASSESSMENT  
(FINAL REPORT)  
KABI ENERGY PHOTOVOLTAIC SOLAR  
ENERGY FACILITY  
KIMBERLEY, NORTHERN CAPE PROVINCE**

**JULY 2011**

**Prepared for**

**SAVANNAH ENVIRONMENTAL (Pty) Ltd**

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## **EXECUTIVE SUMMARY**

### **INTRODUCTION AND LOCATION**

Savannah Environmental (Pty) Ltd was appointed by Kabi Energy (Pty) Ltd as the lead consultants to manage the Basic Assessment (BA) process for the establishment of photovoltaic solar energy facility (PVSEF) and associated infrastructure on section of the remainder of the Farm Kenilworth Estate 71 located ~ 5 km north east of the City of Kimberley in the Northern Cape Province.

Tony Barbour Consulting was appointed by Savannah Environmental (Pty) Ltd to undertake a specialist Social Impact Assessment (SIA) as part of the BA process. The terms of reference for the study include a scoping level assessment followed by a detailed assessment of the social issues as part of the BA. This report contains the findings of the Final SIA undertaken as part of the BA process.

### **DESCRIPTION OF THE PROPOSED SOLAR ENERGY FACILITY**

A broader area of approximately 180 ha is being considered for the development of photovoltaic solar energy facilities. However, the actual development footprint will occupy an area of less than 60 ha. The proposed facility will accommodate an array of photovoltaic (PV) panels with a generating capacity of up to 19 MWp. MWp relates to the number of panels and their maximum output (hence MWp)

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity. Solar PV facilities consist of the following components.

#### **The PV Cell**

A PV cell is generally made of silicon which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a PV panel or module.

#### **The Inverter**

The photovoltaic effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current before delivery into the transmission grid.

#### **The Support Structure**

The PV panels will be fixed to a support structure set at an angle so to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

The basic infrastructure associated with the proposed Kabi Energy PVSEF would include:

- PV solar panels with a generating capacity of ~ 19 MWp;

- An on-site substation to facilitate the connection between the photovoltaic plant and either of the 88 or 132 kV Eskom electricity grid;
- Foundations to support the PV panels;
- Cabling between the project components, to be laid underground where practical;
- Internal access roads; and
- Workshop area for maintenance and storage;
- Fences to secure the project perimeter.

Based on the information provided by Kabi Energy the construction phase is expected to extend over a period of 10-12 months and create approximately 200 employment opportunities. The operational phase will employ approximately 62 people full time for a period of up to 25-30 years.

### **APPROACH TO THE STUDY**

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994). The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA
- Collecting baseline data on the current social environment and historical social trends
- Identifying and collecting data on the SIA variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities
- Assessing and documenting the significance of social impacts associated with the proposed intervention
- Identifying alternatives and mitigation measures

In this regard the study involved:

- Review of demographic data from the 2001 Census Survey
- Review of relevant planning and policy frameworks for the area
- Site specific information collected during the site visit to the area and interviews with key stakeholders
- Review of information from similar projects
- Identification of social issues associated with the proposed project

Due to the requirements for the generation of solar energy, no alternative sites were identified within the area. As such, the EIA does not assess any additional site alternatives for the project.

### **SUMMARY OF KEY FINDINGS**

The key findings of the study are summarised under the following sections:

- Fit with policy and planning;

- Construction phase impacts;
- Operational phase impacts;
- Cumulative Impacts;
- Decommissioning phase impacts;
- No-development option.

The potential health impacts associated with PVSEF s are also discussed.

### **Policy and planning issues**

The key documents reviewed included:

- The National Energy Act (2008)
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998)
- The White Paper on Renewable Energy (November 2003)
- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Frances Baard District Municipality Integrated Development Plan (2007-2011);
- Sol Plaatje Local Municipality Integrated Development Plan (2007-2011).

The findings of the review indicated that solar energy is strongly supported at a national, provincial, and local level. Based on this is it reasonable to assume that the establishment of the proposed Kabi Energy PVSEF is supported.

### **Construction phase**

The key social issues associated with the construction phase include:

#### **Potential positive impacts**

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Based on the information provided by Kabi Energy, the construction phase is expected to extend over a period of 10-12 months and create approximately 200 employment opportunities. Of this total approximately 80% (160) of the employment opportunities will be available to low (construction labourers, security staff etc.), 10% (20) for semi-skilled (drivers, equipment operators etc.) and 10 % (20) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the low skilled employment opportunities are likely to be taken up by members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members from the local community.

The capital expenditure associated with the construction of a 19 MW PVSEF is anticipated to be in the region of R 600 million. In terms of business opportunities for local companies, the expenditure of these sums during the construction phase will create business opportunities for the regional and local economy. However, given the technical nature of the project and high import content associated with PVSEF the opportunities for the local SPLM economy and the City of Kimberley are likely to be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kimberley. In addition, a proportion of the total wage bill earned by construction workers over the 10-12 month construction phase is also likely to be spent in the regional and local economy. Based on information from other renewable energy facilities, the total wage bill for the 10-12 month construction phase will be in the region of R 12-15 million. The benefits to the local economy will however be confined to the construction period (10-12 months).

The establishment of the proposed PVSEF would also create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province, specifically in the SPLM. The need for such cooperation is highlighted in the Northern Cape Provincial Growth and Development Strategy (NCPGDS).

**Potential negative impacts**

- Influx of construction workers employed on the project;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with construction workers;
- Increased risk of veld fires associated with construction related activities;
- Impact of heavy vehicles, including damage to roads, safety, noise and dust;
- Loss of agricultural land associated with construction related activities.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 1 summarises the significance of the impacts associated with the construction phase.

**Table 1: Summary of social impacts during construction phase**

<b>Impact</b>	<b>Significance No Mitigation</b>	<b>Significance With Mitigation</b>
<b>Creation of employment and business opportunities</b>	Low (Positive impact)	Medium (Positive impact)
<b>Presence of construction workers and potential impacts on family structures and social networks</b>	Low (Negative impact)	Low (Negative impact)
<b>Risk of stock theft, poaching and damage to farm infrastructure</b>	Low (Negative impact)	Low (Negative impact)
<b>Risk of grass fires</b>	Medium (Negative impact)	Low (Negative impact)
<b>Impact of heavy vehicles and construction activities</b>	Low (Negative impact)	Low (Negative impact)
<b>Loss of agricultural land</b>	Medium (Negative impact)	Low (Negative impact)

**Operational phase**

The key social issues affecting the operational phase include:

**Potential positive impacts**

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of infrastructure to generate renewable energy.

Based on information provided by Kabi Energy the proposed PVSEF is likely to employ approximately 54 full time employees over the 25-30 year operational phase. Of this total, 52 would be for low-skilled workers, namely cleaners (32) and security (20). The majority of the low-skilled employment opportunities are likely to be taken

up by HD members of the local community. The proposed facility will therefore create potential employment opportunities in the SPLM. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the local economy. The benefits to the local economy will extend over the 25-30 year operational lifespan of the project.

Kabi Energy have also indicated that the 2 skilled personnel (qualified electricians) associated with the operational phase will be trained by Kabi's partner in the project, involving on the job training in South Africa and Spain. This commitment supports the strategic goals of promoting local employment and skills development contained in the SPLM IDP.

The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive High social benefit for society as a whole.

#### **Potential negative impacts**

- The visual impacts and associated impact on sense of place and the landscape;
- Impact on tourism.

The proposed Kabi Energy PVSEF site is located within close proximity of the City of Kimberley in an area that has been used as a mine tailings dump. The visual impacts associated with the proposed PVSEF and associated impacts on the areas sense of place and tourism are therefore likely to be of low significance.

The significance of the impacts associated with the operational phase are summarised in Table 2.

**Table 2: Summary of social impacts during operational phase**

<b>Impact</b>	<b>Significance No Mitigation</b>	<b>Significance With Mitigation</b>
<b>Creation of employment and business opportunities</b>	Medium (Positive impact)	Medium (Positive impact)
<b>Promotion of renewable energy projects</b>	Medium (Positive impact)	Medium (Positive impact)
<b>Visual impact and impact on sense of place</b>	Low (Negative impact)	Low (Negative impact)
<b>Impact on tourism</b>	Low (Positive and Negative)	Low (Positive and Negative)

#### **Cumulative Impacts**

There are two solar projects currently being developed in the vicinity of the City of Kimberley. Mainstream Renewable Power is developing a CSP/PV project to the north of us and ACSA PV is developing a small project near the Kimberley Airport. However, due to the proximity of the proposed Kabi PVSEF to Kimberley and the areas historic use as a mine tailings dump, the potential cumulative impacts in terms of impact on sense of place are regarded as low.

### **Transmission lines**

The findings of the SIA indicate that the impacts associated with the proposed overhead power line will be low.

### **Potential health impacts**

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of photovoltaic cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing photovoltaic modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

### **No-Development Option**

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed PVSEF. This also represents a negative social cost.

### **Decommissioning phase**

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the PVSEF s decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25-30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

When and if the proposed PVSEF is finally decommissioned, the impacts are likely to be limited due to the relatively small number of permanent employees (54) affected. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

In terms of future rehabilitation of the site, Kabi Energy has established a mechanism that will ensure that sufficient funds are available to cover costs associated with decommissioning of the PVSEF. In addition, as owner of the mining right, De Beers has ultimate responsibility for the rehabilitation of the site.

## **RECOMMENDATIONS**

The findings of the SIA indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. While these opportunities are likely to be limited, the mitigation measures listed in the report should be implemented in order to enhance them. In addition the potential visual and sense of place impacts associated with the proposed PVSEF are low. This due to the sites location on an area used as a mine tailings dump and within close proximity of the City of Kimberley. The proposed site is therefore well suited for the establishment of a PVSEF.

Kabi Energy has also entered into discussions with the landowner, De Beers, and the Industrial Development Corporation (IDC) on identifying community groupings and Corporate Sustainability Investment (CSI) initiatives in the Kimberley region. In addition, all rental payments paid by Kabi Energy to De Beers for use of the land during the operational period will be directed towards CSI spend. The mitigation measures listed in the report to address the potential negative impacts during the construction phase should also be implemented.

The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed Kabi Energy PVSEF is therefore supported by the findings of the SIA.

## **IMPACT STATEMENT**

The findings of the SIA indicate that the proposed Kabi Energy PVSEF site is well suited for the establishment of a PVSEF. This due to the sites location on an area used as a mine tailings dump and within close proximity of the City of Kimberley. It is therefore recommended that the facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

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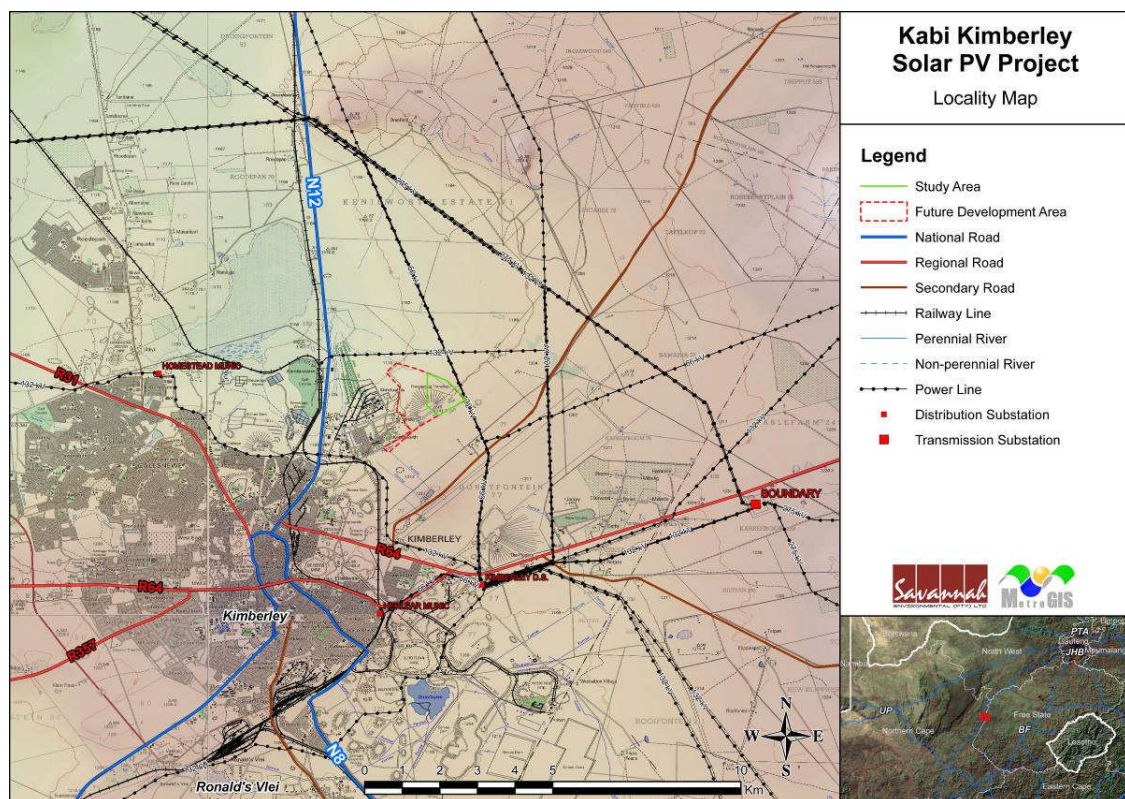
# SECTION 1: INTRODUCTION

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## 1.1 INTRODUCTION

Savannah Environmental (Pty) Ltd was appointed by Kabi Energy (Pty) Ltd as the lead consultants to manage the Basic Assessment (BA) process for the establishment of photovoltaic solar energy facility (PVSEF) and associated infrastructure on section of the remainder of the Farm Kenilworth Estate 71 located ~ 5 km north east of the City of Kimberley in the Northern Cape Province (Figure 1.1).

Tony Barbour Consulting was appointed by Savannah Environmental (Pty) Ltd to undertake a specialist Social Impact Assessment (SIA) as part of the BA process. The terms of reference for the study include a scoping level assessment followed by a detailed assessment of the social issues as part of the BA. This report contains the findings of the Final SIA undertaken as part of the BA process.



**Figure 1.1: Location of the proposed Kabi Energy PVSEF (MetroGIS, 2011)**

## **1.2 TERMS OF REFERENCE**

The terms of reference for the SIA require:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility
- A description and assessment of the potential social issues associated with the proposed facility
- Identification of enhancement and mitigation aimed at maximizing opportunities and avoiding and or reducing negative impacts

## **1.3 PROJECT LOCATION**

The proposed facility is located approximately 5 km north-east of the City of Kimberley on part of the remainder of Farm Kenilworth Estate 71 in the Northern Cape Province (Figure 1.1). The property is owned by the De Beers Mining Company Ltd and was identified for the establishment of a solar park concept.

The proposed site falls within the Sol Plaatje Local Municipality, which has its administrative centre in Kimberley. The Sol Plaatje Local Municipality is one of four local municipalities that fall within the greater Frances Baard District Municipality. Road access to the proposed site is likely to be from the N12 and or the R 64 located to the west and south of the site respectively.

## **1.4 PROJECT DESCRIPTION**

A broader area of approximately 180 ha is being considered for the construction of PV solar energy facilities. However, the actual development footprint will occupy an area of less than 60 ha. The proposed facility will accommodate an array of PV panels with a generating capacity of up to 19 MW. Photograph 2.1 illustrates a typical array of PV panels associated with a PVSEF.



Source: Solarpack

**Photograph 1.1: Example of Photovoltaic array**

Solar energy facilities, such as those using PV panels, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect. This effect refers to photons of light colliding with electrons, and therefore placing the electrons into a higher state of energy to create electricity. The photovoltaic solar facility component of the development is anticipated to of generating capacity of up to 19 MW.

Solar PV facilities typically consist of the following components:

**The Photovoltaic Cell**

A PV cell is made of silicon which acts as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a PV panel.

**The Inverter**

The photovoltaic effect produces electricity in direct current. Therefore an inverter must be used to change it to alternating current.

**The Support Structure**

The PV panels will be fixed to a support structure set at an angle so to receive the maximum amount of solar radiation. The angle of the panel is dependent on the latitude of the proposed facility and the angles may be adjusted to optimise for summer or winter solar radiation characteristics. The PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

The basic infrastructure associated with the proposed Kabi Energy PVSEF would include:

- PV solar panels with a generating capacity of ~ 19 MW;
- An on-site substation to facilitate the connection between the photovoltaic plant and either of the 88 or 132 kV Eskom electricity grid;
- Foundations to support the PV panels;
- Cabling between the project components, to be laid underground where practical;
- Internal access roads; and
- Workshop area for maintenance and storage;
- Fences to secure the project perimeter.

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the solar radiation, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits zero greenhouse gas emissions. The generation of renewable energy contributes to South Africa's electricity generating market which has been dominated by coal-based power generation.

Based on the information provided by Kabi Energy the construction phase is expected to extend over a period of 10-12 months and create approximately 200 employment opportunities. The operational phase will employ approximately 54 people for a period of up to 25-30 years. It is anticipated that twenty two (22) staff members will be employed on a permanent basis of which twenty (20) will be full-time security positions, and two (2) positions for operation/maintenance. The remaining thirty two (32) staff members will only be needed twice per year during the cleaning of the PV panels and would thus not be employed on a permanent basis.

## **1.5 APPROACH TO STUDY**

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994). The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the settlements and communities likely to be affected by the proposed project
- Collecting baseline data on the current social and economic environment;
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development so as to enable them to better understand and comment on the potential social issues and impacts.

- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of demographic data from the 2001 Census Survey;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the site visit to the area and interviews with interested and affected parties;
- Review of information from similar studies, including the EIAs undertaken for other renewable energy projects, including wind energy facilities;
- Identification and assessment of the social issues associated with the proposed project.

The identification of potential social issues associated with proposed facility is based on observations during the project site visit, review of relevant documentation, experience with similar projects and the area. Annex A contains a list of the secondary information reviewed and interviews conducted. Annex B summarises the assessment methodology used to assign significance ratings to the assessment process.

### **1.5.1 Definition of social impacts**

Social impacts can be defined as “the consequences to human populations of any public or private actions (these include policies, programmes, plans and/or projects) that alter the ways in which people live, work, play, relate to one another, organise to meet their needs and generally live and cope as members of society. These impacts are felt at various levels, including individual level, family or household level, community, organisation or society level. Some social impacts are felt by the body as a physical reality, while other social impacts are perceptual or emotional” (Vanclay, 2002).

When considering social impacts it is important to recognise that social change is a natural and on-going process (Burdge, 1995). However, it is also important to recognise and understand that policies, plans, programmes, and/or projects implemented by government departments and/or private institutions have the potential to influence and alter both the **rate** and **direction** of social change. Many social impacts are not in themselves “impacts” but change process that may lead to social impacts (Vanclay, 2002). For example the influx of temporary construction workers is in itself not a social impact. However, their presence can result in range of social impacts, such as increase in antisocial behaviour. The approach adopted by Vanclay stresses the importance of understanding the processes that can result in social impacts. It is therefore critical for social assessment specialists to think through the complex causal mechanisms that produce social impacts. By following impact pathways, or causal chains, and specifically, by thinking about interactions that are likely to be caused, the full range of impacts can be identified (Vanclay, 2002).

An SIA should therefore enable the authorities, project proponents, individuals, communities, and organisations to understand and be in a position to identify and anticipate the potential social consequences of the implementation of a proposed policy, programme, plan, or project. The SIA process should alert communities and

individuals to the proposed project and possible social impacts, while at the same time allowing them to assess the implications and identify potential alternatives. The assessment process should also alert proponents and planners to the likelihood and nature of social impacts and enable them to anticipate and predict these impacts in advance so that the findings and recommendations of the assessment are incorporated into and inform the planning and decision-making process.

However, the issue of social impacts is complicated by the way in which different people from different cultural, ethnic, religious, gender, and educational backgrounds etc view the world. This is referred to as the "social construct of reality". The social construct of reality informs people's worldview and the way in which they react to changes.

### **1.5.2 Timing of social impacts**

Social impacts vary in both time and space. In terms of timing, all projects and policies go through a series of phases, usually starting with initial planning, followed by implementation (construction), operation, and finally closure (decommissioning). The activities, and hence the type and duration of the social impacts associated with each of these phases are likely to differ.

## **1.6 ASSUMPTIONS AND LIMITATIONS**

### **1.6.1 Assumptions**

#### **Strategic importance of the project and no-go option**

It is assumed that the strategic importance of promoting renewable energy, including solar energy, is supported by the national and provincial energy policies.

#### **Technical suitability**

It is assumed that the development site identified by Kabi Energy represents a technically suitable site for the establishment of a PVSEF.

#### **Fit with planning and policy requirements**

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for such facilities.

#### **Generic issues relating to renewable energy**

A number of the key authorities in the Northern Cape Province were interviewed in 2010 as part of the SIAs for other solar energy facilities located near Upington and Pofadder. For the purpose of the SIA it is assumed that a number of the generic

comments relating to renewable energy, and specifically solar energy, also apply to the Kabi Energy PVSEF.

### **1.6.2 Limitations**

#### **Demographic data**

The demographic data used in the study is largely based on the 2001 Census<sup>1</sup>. While this data does provide useful information on the demographic profile of the affected area, the data are dated and should be treated with care. Where possible reference is made to the latest demographic data contained in local Integrated Development Plans and other documents.

In addition, there is no longer any access to Census 2001 data at Ward level via the Municipal Demarcation Board. As such, the social baseline for the Sol Plaatje Local Municipality has been described at Local Municipal level only.

## **1.7 SPECIALIST DETAILS**

The author of this report is an independent specialist with 20 years of experience in the field of environmental management. His qualifications include a BSc, BEcon (Hons) and an MSc in Environmental Science. In terms of SIA experience Tony Barbour has undertaken in the region of 100 SIA's and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007.

## **1.8 DECLARATION OF INDEPENDENCE**

This confirms that Tony Barbour is independent and does not have a vested or financial interest in the proposed Kabi Energy PVSEF being either approved or rejected.

## **1.9 REPORT STRUCTURE**

The report is divided into five sections, namely:

- Section 1: Introduction
- Section 2: Overview of the study area
- Section 3: Summary of key policy and planning documents relating to solar energy and the area in question
- Section 4: Identification and assessment of key social issues
- Section 5: Summary of key findings and recommendations

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<sup>1</sup> The last comprehensive national census was conducted in 2001. Census 2001 provided demographic and socio-economic data from National to Municipal Ward level. An interim Community Survey (sample based) was undertaken in 2007, but provided information only on provincial and municipal levels. The next comprehensive national census is planned for 2011.

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## **SECTION 2: DESCRIPTION OF STUDY AREA**

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### **2.1 INTRODUCTION**

Section 2 provides an overview of:

- The provincial context;
- The policy and planning environment affecting the proposed PVSEF ;
- The local socio-economic environment;
- Surrounding land uses.

### **2.2 PROVINCIAL CONTEXT**

The proposed solar energy facility is located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361,830 km<sup>2</sup>, and constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Pixley ka Seme, Namakwa, Siyanda, and John Taolo Gaetsewe DM, twenty-six Category B municipalities and five district management areas. The site itself is located in the Sol Plaatje Local Municipality (LM), which is one of four local municipalities that fall within the greater Frances Baard District Municipality.

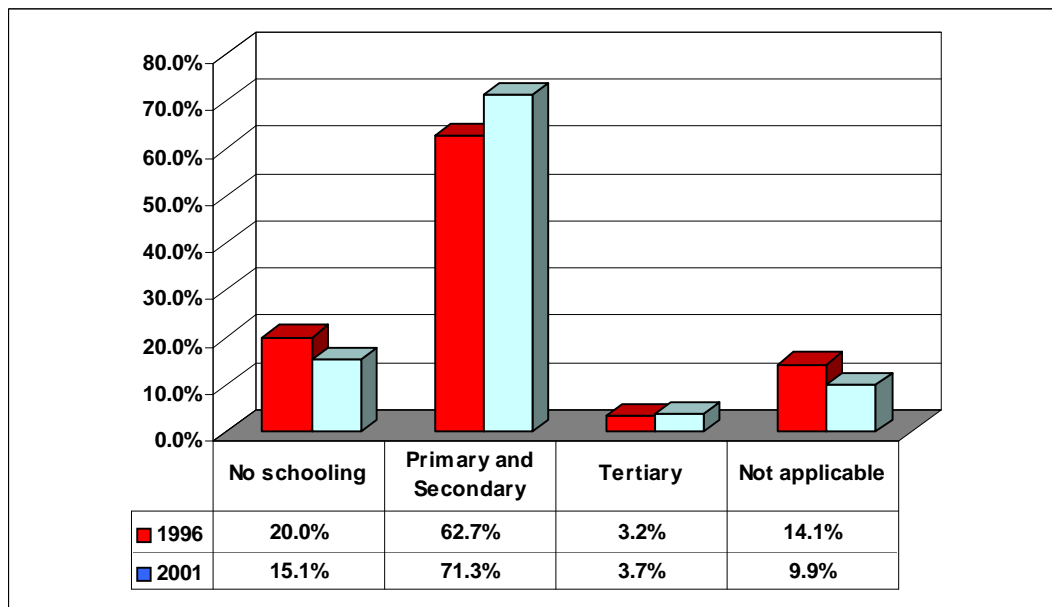
#### **Population**

Despite having the largest surface area, the Northern Cape has the smallest population of 822 727 (Census 2001) or 1.8% of the population of South Africa. The population has declined by 2.1% from 1996 (840 321) to 2001 (822 727), resulting in a decrease in the population density, of an already sparsely populated province, from 2.32 to 2.27 persons per km<sup>2</sup>. Of the five districts, Frances Baard has the largest population of 303 239. The other districts and their respective populations are Siyanda (209 889), Karoo (164 607), Kgalagadi (36 881) and Namakwa (108 111). The population can be classified as a young population with 57.7% of the population being younger than 30 years old. The female proportion makes up approximately 51.2% of the total with males making up the remaining 48.8%. The 2001 Census data indicates a significant shift in the 20 – 24 cohort occurs, which can possibly be attributed to, amongst others, people in this age group moving to other provinces in search of better career and job opportunities and tertiary education. Research indicates that approximately 36% of the migrants from the Northern Cape moved to the Western Cape, while 19.4% moved to the North West (19.4%), 18.5% to Gauteng and 12.8% to the Free State (12.8%). In addition, there has also been an increase in migration from the rural areas to the larger towns in the province over the last five years. This movement is in response to the improved access to opportunities and services within the larger urban centers. This trend is reflected in the increase in the proportion of people living in urban areas from 75.2% in 1996 to 82.7% in 2001

## Education

In terms of education levels 15.1% of the population had no education at all, while 71.3% have primary or secondary education. Those with a higher educational qualification accounted for 3.7% of the population (Figure 2.1). These figures indicate an increase in all categories since 1996, except for the no schooling category, which decreased by 4.9% indicating a higher percentage of people attending school.

The information contained in Figure 2.1, indicates that, in general, there has been an improvement in the educational qualifications of the labour force in the Northern Cape. There has also been an increase in the proportion of the labour force that has a secondary and tertiary education. This would appear to be the result of an increase in access to education since 1994, in particular, amongst new entrants to the labour force.



**Figure 2.1: Percentage of people by level of education for 1996 and 2001**  
(Source: Northern Cape Province NCNCPGDS)

## Economic development

The Human Development Index<sup>2</sup> (HDI) for the province, which covers four indexed factors – life expectancy, adult literacy, GDP per capita (adjusted for real income) and education attainment, for the Northern Cape as a whole is 0.58, which is substantially below the South African figure of 0.72.

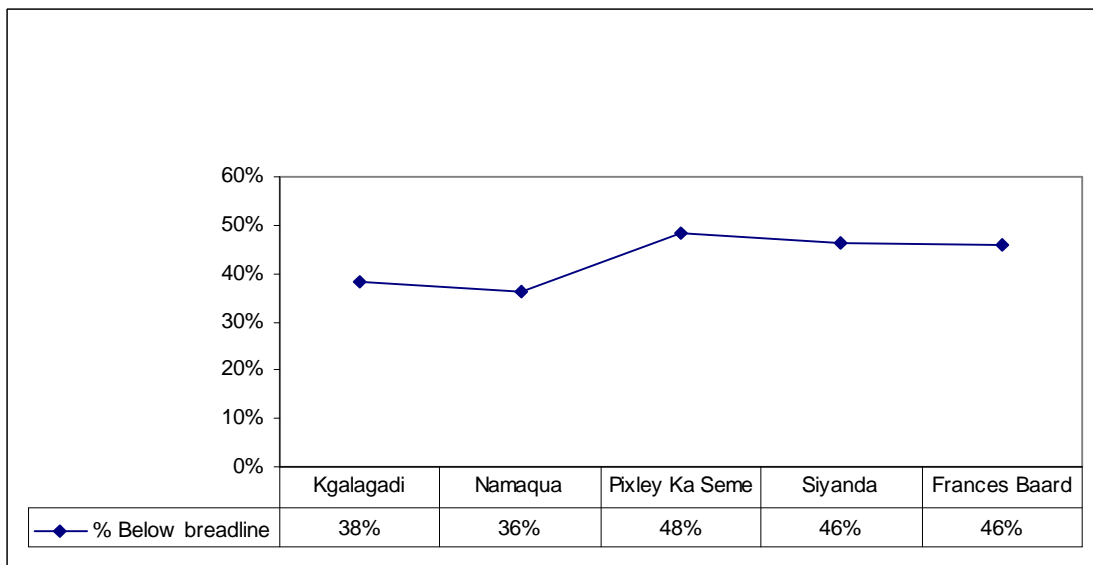
For the Northern Cape, the areas of lowest Human Development Index include the South Eastern region (Noupoort and Richmond) and the hinterland of Kimberley (Griekwastad, Campbell and Douglas) – for these areas the HDI varies between 0.47 to 0.51. Over the past 8 years there has been little to no variance in the HDI figures, indicating no increase or decrease in the overall standard of living. In contrast, the Kimberley and Springbok areas have the highest HDI of 0.63 to 0.62

<sup>2</sup> The closer the HDI to 1.0, the higher the level of "living condition". For example, Sweden has an index of 0.91 defined as high, South Africa at 0.72 is defined as middle and Lesotho at 0.47 is defined as low.

respectively, primarily due to the broader economic opportunities and access to services such as infrastructure, schools, and health facilities. Similarly, there has been no significant change over the past 8 years.

The above trend is unlikely to change in the foreseeable future, mainly due to the marginal economic base of the poorer areas, and the consolidation of the economic base in the relatively better off areas.

In terms of per capita income, the Northern Cape Province has the third highest per capita income of all nine Provinces, however, income distribution is extremely skewed, with a high percentage of the population living in extreme poverty. The measure used in the NCNCPGDS document to measure poverty is the percentage of people living below the poverty line or breadline is used<sup>3</sup>. The poverty line indicates a lack of economic resources to meet basic food needs. Figure 2.2 indicates the percentage of household income below the poverty breadline of R800 in the Northern Cape Province, the highest being Karoo at 48% and the lowest being Namakwa at 36%.



**Figure 2.2: Percentage of household income below the poverty breadline by district** (Source: Northern Cape NCPGDS)

### Economic sectors

In terms of economic importance, the Northern Cape's share of the country's Gross Domestic Product (GDP) in 2002 was 2%, the lowest contribution of the nine provinces. However, although the Northern Cape Province has the smallest economy of the nine provinces, Gross Domestic Product of the Region (GDPR) per capita is higher than the national average. In terms of economic activities, the economy of Northern Cape is heavily dependent on the primary sectors of the economy, which in 2002 made up 31.0% of GDPR. The largest sector is mining which has declined in contribution to the GDPR from 25.8% in 1996 to 23.7% in 2002. Agriculture, on the other hand, increased in its contribution from 6.2% to 7.3%.

<sup>3</sup> In terms of the poverty line, a person is considered poor if his or her consumption or income level falls below some minimum level necessary to meet basic needs. The minimum level is usually called the poverty line. In South Africa the poverty income level is set at R800/month.

A worrying characteristic of the economy is the limited amount of processing of the primary commodity output in mining and agriculture that takes place in the Northern Cape. This is reflected in the fact that manufacturing contributes only 4.2% towards GDP. All the industries in the secondary sector have decreased in their contribution to the GDP, with electricity and water sector showing the greatest decrease of 0.7% and the construction industry making the lowest contribution of 1.9% to the GDP of the Northern Cape. At the same time the contribution to regional GDP by industries in the tertiary sector increased, with the exception of the wholesale and retail industry, which decreased by 1.1%. Figure 2.3 illustrates the percentage contribution of the various economic sectors to the GDP of the Northern Cape

### **Employment**

Of the economically active population in the Northern Cape, 55.5% were employed while 26.1% could not find employment. This unemployment figure is lower than the national figure of 29.5%. Significant for this province, however, is that a third of the total population is younger than 15 years old and approximately 45% of the potential labour force is younger than 30 years. At the same time, unemployment is the highest among the youth with unemployment rates of 54% and 47% in the 15 - 19 and 20 - 24 year-old age groups. There has been an increase in the economically active population from 35.9% in 1996 to 38.1% in 2001. The unemployment rate for the same period has increased from 28.3% to 33.4%. In terms of employment there has been a decrease in the number of people that are formally employed from 196 219 in 1996 to 193 980 in 2001. The largest decrease was in the private household sector, showing a loss of 4 859 jobs.

The most important sectors in terms of employment in 2002 were agriculture, hunting, forestry and fishing (28.4%), community, social and personal services (19.8%), wholesale and retail trade (12.7%) and private households (11.4%) (Table 2.1).

Sectors	1996	1996 % of persons employed per sector	2001	2001 % of persons employed per sector
<b>Primary</b>				
Agriculture, hunting; forestry and fishing	48646	24.8	55016	28.4
Mining and quarrying	18556	9.5	15493	8.0
<b>Secondary</b>				
Manufacturing	8812	4.5	10598	5.5
Electricity; gas and water supply	2397	1.2	1385	0.7
Construction	10402	5.3	8971	4.6
<b>Tertiary</b>				
Wholesale and retail trade	23099	11.8	24671	12.7
Transport; storage and communication	9963	5.1	6366	3.3
Financial, insurance, real estate and business services	7733	3.9	10989	5.7
Community, social and personal services	39724	20.2	38463	19.8
Private Households	26887	13.7	22028	11.4
<b>Total</b>		<b>196219</b>		<b>193980</b>

**Table 2.1: Formal employment by sector (Source: Northern Cape NCPGDS)**

### **2.3 SOCIO-ECONOMIC OVERVIEW OF THE PROPOSED PROJECT AREA**

As indicated in Section 1.6.2 Limitations, it is no longer possible to access Census 2001 data at Ward level via the Municipal Demarcation Board. As a result it was not possible to obtain ward level data for the Sol Plaatjie Local Municipality. The social baseline for this part of the study area is therefore described at Local Municipal level only.

#### **3.2.1 Frances Baard District Municipality (FBDM)**

FBDM is a category C-Municipality that is made up of four category B municipalities, namely: Sol Plaatje, Dikgatlong, Magareng and Phokwane. The total geographical area of the municipality is 12 384 km<sup>2</sup> and it accounts for 3.4% of the total area of the Northern Cape Province.

#### **Population**

Based on a study conducted by Global Insight in 2010 the population total for FBDM was in the region of 371 536. This represents an estimated increase of 5% when compared to the data from the Community Survey: 2007 (353 198).

## Employment

FBDM had 118 058 economically active people in 2009 of which 62 268 were male while 55 790 were females. In terms of employment, 66 791 persons were employed (both formal and informal) in the Frances Baard District in 1996. The number of total employed increased to 78 313 in 2009, which represented an increase of 11,522 persons for the period 1996-2009. Of the 78 313 persons employed in 2009, just over 10% (7 931 persons) were employed in the informal sector. In terms of formal employment in the District the most important sectors are the Community Services, Trade and Finance sectors (Table 2.2).

Frances Baard Formal Employment, Broad Economic Sectors: 2009					
Sector	Sol Plaatje	Dikgatlong (inc Diamondfields DMA)	Magareng	Phokwane	Totals
Agriculture	1,284	573	613	3,901	6,372
Mining	1,514	1,074	44	68	2,701
Manufacturing	3,167	453	85	642	4,348
Electricity	350	51	13	149	563
Construction	2,532	189	69	661	3,451
Trade	9,845	336	283	2,550	13,014
Transport	3,487	149	108	310	4,053
Finance	4,932	200	32	808	5,972
Community services	16,470	923	764	3,109	21,266
Households	5,137	717	462	2,326	8,642
<b>Total</b>	<b>48,719</b>	<b>4,666</b>	<b>2,473</b>	<b>14,524</b>	<b>70,382</b>

**Table 2.2: Employment by broad economic sectors in FBDM**

Source: Global Insight (2009)

## Economic Sectors

In terms of economic activity, Community services contributed 28% to the districts economy, followed by finance at 23%, trade at 15%, transport at 11% and mining at 9% (Figure 2.3). The District's agricultural production is made up of predominantly field crops followed by animal products, animal and horticulture sub-sectors. The actual products in these sub-sectors are wheat, fruit, peanuts, maize, cotton, olives, cattle, game farming, viticulture, fishing and vegetables. Of concern is the limited level of agro processing.

Mining also represents an important economic sector, with diamonds and limestone constituting the most important minerals. Of these, diamond mining is the dominant contributor to mining production. Small scale mining has become one of the strategic ways of maintaining and increasing mining value addition in the district.

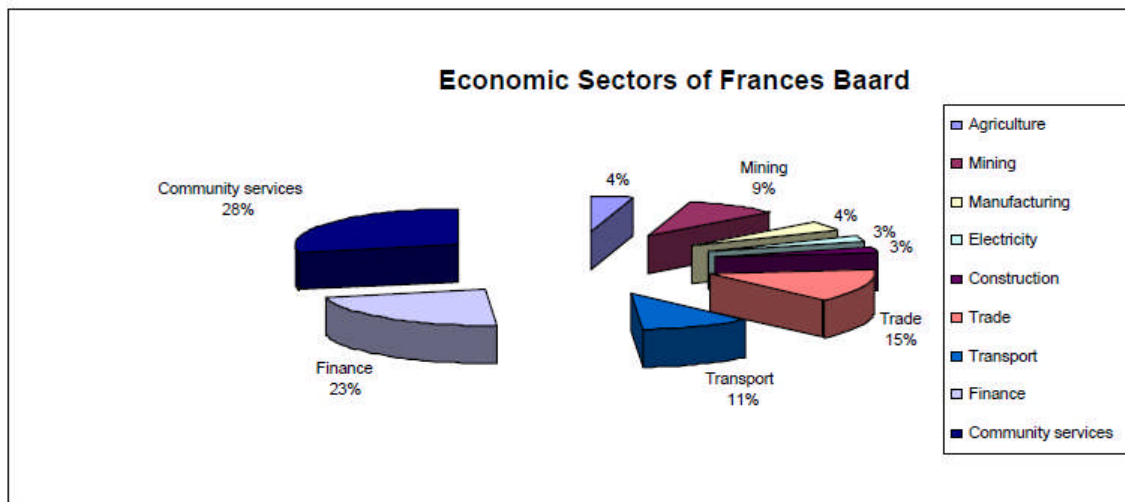
Manufacturing in the Province and in the Districts has not fully developed, and only contributes about 2.4% to the Provincial GDP while in FBDM the contribution is in the region of 1.3% of total value addition.

A number of economic challenges facing FBDM have been identified, these include:

- Manufacturing is being promoted from a low base, not much agro processing and beneficiation is taking place although the District is primary sector based.

- There is low entrepreneurial culture
- There is limited diversification of production
- There are no identified and developed export markets, including developed tools to attract foreign investors like incentives
- The regional market is small with most areas not densely populated to support economies of scale.
- Poor accessibility, caused by low weak transport linkages to major economic nodes and the state of the district roads.
- The district suffers from high levels of unemployment (41%), high levels of HIV/AIDS (19.81%) widespread poverty and low levels of disposable income. Currently the Frances Baard District has the highest prevalence in the Northern Cape Province (HIV & AIDS Strategic Plan: 2010-2014).

These aspects have undermined the economic development potential of the Frances Baard region.



**Figure 2.3: Economic Sectors FBDM**

Source: Global Insight (2009)

### 3.2.2 Sol Plaatje Local Municipality<sup>4</sup> (SPLM)

Kimberley, which is located in SPLM, is the seat of the Provincial Legislature for the Northern Cape and the Provincial Administration. It services the mining and agricultural sectors of the region. The city also projects itself as a significant tourist destination, the 'City that Sparkles', boasting a diversity of museums and visitor attractions. It is also a gateway to other Northern Cape destinations including the Mokala National Park, nature reserves and numerous game farms or hunting lodges, as well as historic sites of the region.

<sup>4</sup> As indicated under Section 1.5.2 the demographic data for the area is dated (2001 Census) and Ward level data is no longer accessible via the web. During the EIA phase, the SIA team will attempt to supplement Census 2001 data, which may be available from officials and key community representatives.

## Population

SPLM covers an area of 1 873 km<sup>2</sup> and has a total population of 245 606 (SPLM IDP Review, 2010-2011), which accounts for approximately 30% of the total population of the Northern Cape Province. SPLM therefore makes up the majority of the population of the FBDM. Of this total 99.2% of the population is urbanised, with Kimberley (167 000) and Ritchie (9 960) being the two largest settlements within the LM. Approximately 57% of the population falls within the age group 20-64.

Over the last ten years, the population in SPLM has grown slowly at an average pace of 0.92% per annum. According to the IDP 54% of the population in 2001 was African, 32% Coloured, 13% White and 1% Indian (Table 2.3). In terms of age, 56.7% of the total population in SPLM were between the ages of 20 and 65, in comparison with 53.9% for the Northern Cape.

Persons	2001	1996	Change over 5 years		Annual ave % change	% Composition 2001
			Number	Percent		
African	109,714	105,838	3,876	4%	0.7%	54%
Coloured	63,918	63,655	263	0%	0.1%	32%
Indian	1,612	1,809	-197	-11%	-2.3%	1%
White	26,220	29,587	-3,367	-11%	-2.4%	13%
Total Population	201,464	204,263	-2,799	-1%	-0.3%	100%

**Table 2.3: Population SPLM (SPLM, IDP, 2007-2011)**

## Employment

In 2006, there were an approximately 60 000 people employed in SPLM, which is approximately 25.9% of all people employed in the Northern Cape. Approximately 32 000 people were unemployed. The unemployment rate in 2008 was estimated to be in the region of 40% (Global Insight, 2008).

## Economy

SPLM accounted for approximately 30% of total provincial Gross Domestic Product (GDP) in 2009 - and 82.1% of FBDM, making it the most important LM in FBDM (Global Insight: 2010). The largest economic role-players in SPLM include the tertiary sector i.e. community services, finance, transport and trade. The mining sector also contributes significantly towards the economy, - although its contribution has steadily declined over the last 20 years or so.

It is estimated that 74,147 people from SPLM were living in poverty in 2006. Of this amount, 77.5% were from the black communities. However, these numbers have decreased at an average of 1.7% per annum since 2001. In 2006, the annual disposable income in SPLM grew at an average of 5.65% per annum from 2001. The population group that experienced the highest growth in its annual disposable income was the black population, which also accounted for 39.9% of total disposable income in 2006. Despite this the poverty gap in Sol Plaatje has increased in recent years meaning that persons or households lack the resources necessary to be able to consume a certain minimum basket of goods.

## 2.4 SURROUNDING LAND USES

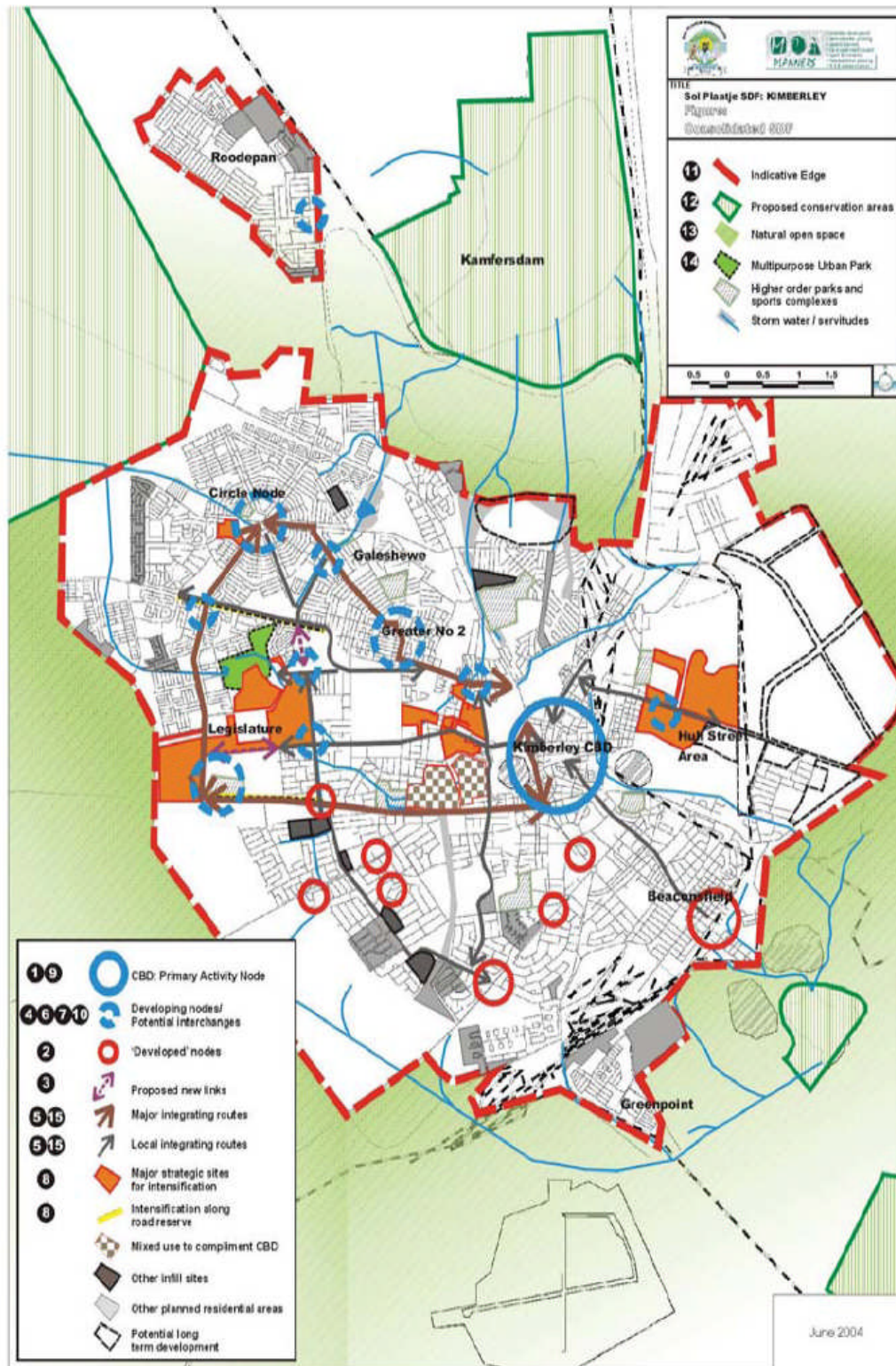
The proposed Kabi Energy PVSEF is located approximately 5 km north-east of the Kimberley CBD area. The land is owned by the De Beers and has been used as dump for mine tailings that are currently being transported off-site to be reworked. The area to the east of the proposed site is currently run as a game farm. Historically the Kenilworth Farm area was used for growing vegetables.

The N12, which links Kimberley to Johannesburg, runs in a north south direction and is located approximately 2 km to the west of the site. The Kimberley Golf Course and sewage works are also located approximately 2 km to the west of the site and are separated from the site by the N12 and an industrial area that includes a railway siding located along the western boundary of the PVSEF site. The Kimberley Show Grounds and De Beers Mine are located approximately 2 and 4 km south-west of the site respectively, while the Kimberley Mine, the "Big Hole", is located approximately 5 km south west of the site. The R64 runs in an east west direction approximately 5 km to the south of the site.

The land which is earmarked for the development, currently falls within the mining licensed area, and it is actively being mined in preparation for the construction of the PVSEF, according to the Kimberley Mines mining plan and rehabilitation plan. The majority of the land is covered by the "Kenilworth Tailings Mineral Resource" (TMR) as per the Kimberley Mines Strategic Business Plan (SBP). This TMR was previously regarded as a "tailings dump" and was used as a deposition site for coarse residue from the mining activities at De Beers Mine.

The closure criteria for mined out TMR's is firstly to ensure that land is rendered useful for sustainable future land use, to ensure that there is no residual and latent environmental risks. At this stage, the site has the potential to either become an extension of the current De Beers Ecology managed Dronfield Nature Reserve (to the north); or to become part of the Kimindustria industrial area to the west. The solar energy facility will fit into the latter scenario; turning a previously disturbed mining area into a renewable energy facility, rendering the land end use sustainable, safe and relatively free from further environmental risks.

In terms of land use planning, land use planning map for Kimberley indicates that that the proposed Kabi Energy PVSEF borders on the current urban edge of the town (Figure 2.4)(SPLM Integrated Development Plan (2007-2011)). Photographs 2.1-2.4 illustrate the general terrain on the site.



Source: SPLM Integrated Development Plan (2007-2011).  
**Figure 2.4: Land use map for Kimberley**



**Photograph 2.1: View from the west looking east at the existing tailings dumps on the site**



**Photograph 2.2: View over the proposed site looking towards the east**



**Photograph 2.3: View from the north looking south at the existing tailings dumps on the site**



**Photograph 2.4: View from the south looking north over the towards the existing tailings dumps on the site**

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## **SECTION 3: POLICY AND PLANNING CONTEXT**

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### **3.1 INTRODUCTION**

Section 3 provides an overview of the policy and planning environment affecting the proposed PVSEF. For the purposes of the meeting the objectives of the EIA the following policy and planning documents were reviewed, namely:

- The National Energy Act (2008)
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998)
- The White Paper on Renewable Energy (November 2003)
- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Frances Baard District Municipality Integrated Development Plan (2007-2011);
- Sol Plaatjie Local Municipality Integrated Development Plan (2007-2011);

The section also provides a summary some of the key social issues associated with solar facilities based on international experience.

### **3.2 NATIONAL LEVEL ENERGY POLICY**

#### **3.2.1 NATIONAL ENERGY ACT (ACT No 34 OF 2008)**

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar:

"To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (...); to provide for (...) increased generation and consumption of renewable energies..." (Preamble).

#### **3.2.2 White Paper on the Energy Policy of the Republic of South Africa**

Investment in renewable energy initiatives, such as the proposed PVSEF, is supported by the White Paper on Energy Policy for South Africa (December 1998). In this regard the document notes:

"Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential".

"Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly **solar** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented;
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options; and,
- Addressing constraints on the development of the renewable industry.

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive and many appropriate applications exist.

The White Paper also notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:

- Minimal environmental impacts in operation in comparison with traditional supply technologies;
- Generally lower running costs, and high labour intensities.

Disadvantages include:

- Higher capital costs in some cases
- Lower energy densities
- Lower levels of availability, depending on specific conditions, especially with sun and wind based systems

### **3.2.3 White Paper on Renewable Energy**

This White Paper on Renewable Energy (November, 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol, Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copehhagen Accord, a document that delegates at the 15th session of the Conference of Parties(COP 15) to the United

Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is:

*10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW) (Executive Summary, ix).*

### **3.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING**

#### **3.3.1 Northern Cape Province Provincial Growth and Development Strategy**

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) notes that the most significant challenge that the government and its partners in growth and development are confronted with is the **reduction of poverty**. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:

- Agriculture and Agro-processing
- Fishing and Mariculture
- Mining and mineral processing
- Transport
- Manufacturing
- Tourism

However, the NCPGDS also notes that economic development in these sectors also requires:

- Creating opportunities for lifelong learning
- Improving the skills of the labour force to increase productivity
- Increasing accessibility to knowledge and information

The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are:

- Developing requisite levels of human and social capital
- Improving the efficiency and effectiveness of governance and other development institutions
- Enhancing infrastructure for economic growth and social development

Of specific relevance to the SIA the NCPGDS make reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the NCPGDS notes "the development of energy sources such as **solar energy**, the natural gas fields, bio-fuels, etc, could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised.

The NCPGDS also highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed solar energy facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

In this regard care will need to be taken to ensure that the proposed PVSEF and other renewable energy facilities do not negatively impact on the regions natural environment. In this regard the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed solar energy facility, do not affect the tourism potential of the province.

### **3.3.2 Frances Baard District Municipality Integrated Development Plan 2009-2012**

The FBDM Integrated Development Plan (IDP) (2009-2012) is based on the requirements and guidance of the Municipal Systems Act (Act No. 32 of 2000) which identifies 5 broad strategic priority areas for consideration during the IDP process. These broad strategic priority areas are as follows:

- Infrastructure and Services;
- Social and Economic Development;
- Institutional Transformation;
- Democracy and Governance; and,
- Financial Management/Viability.

The IDP notes that the FBDM is regarded as a weak region economically due to:

- Manufacturing is being promoted from a low base, not much agro processing and beneficiation is taking place although the District is primary sector based;
- There is low entrepreneurial culture;
- There is limited diversification of production;
- There are no identified and developed export markets, including developed tools to attract foreign investors like incentives;
- The regional market is small with most areas not densely populated to support economies of scale;
- Poor accessibility, caused by low weak transport linkages to major economic nodes and the state of the district roads;
- The district suffers from high levels of unemployment (41%), high levels of HIV/AIDS (19.81%) widespread poverty and low levels of disposable income.

Chapter 3 of the IDP outlines the objectives and strategies for the region. Of relevance to the study are the sections on basic service delivery, local economic development and tourism. In terms of basic service delivery one of the key objectives is to support the provision of electricity to all households in the district by 2014. The section on local economic development seeks to ensure and promote SMME capacity building programmes, while the tourism section sets out to market and promote the area as a tourism destination. The proposed establishment of a PSEF in the SPLM has the potential to support the objectives of the basic service delivery and economic development sections of the IDP. However, the establishment of a large number of large PVSEF's may impact negatively on the tourism objectives of the area as set out in the IDP and NCPGDS.

### **3.3.3 Sol Plaatje Local Municipality Integrated Development Plan (2010)**

Section 6.3.2, Sustainable Development-The Sol Plaatjie Situation, is of relevance to the proposed Kabi Energy PVSEF. The SPLM was introduced to the concept of sustainable development during the Swedish (Sida) Urban Planning and Environmental support programme from 1997 to 1999. During this period a Local Agenda 21(LA21) process was established in Kimberley and a formal position of a LA21 Co-ordinator was created. As part of this initiative, the Sustainable Energy and Climate Change Unit (SECCU) was established in the Directorate: Community and Social Development Services in February 2007. With reference to the proposed PVSEF project, the Unit's main objectives are:

- To stimulate sustainable energy approaches and practices within SPLM as well as the integration of energy efficiency objectives into all its functions.
- To assist SPLM to support the national and international commitment to reduce greenhouse gases (GHGs).
- To synergise energy related tasks and initiatives already underway within the City towards a common energy goal;
- To initiate steps towards declaring SPLM a Solar City. The IDP notes that in 2004 the former premier, Mr Manne Dipico, declared the Northern Cape Province the Solar Province of South Africa due to its enormous amount of sunshine. Kimberley is the capital of the Northern Cape Province and it would be appropriate that it becomes directly involved in fulfilling this goal, and drive towards declaring itself a Solar City. The proposed Kabi Energy PVSEF therefore supports the objective of developing solar energy in the SPLM and Northern Cape.

In addition, the focus of the IDP is in concentrated its efforts in aligning its LED initiatives with that of the Provincial and District GDS, to support the SMME sector,

supporting the Province in its tourism initiatives and ensuring an enabling environment for the private sector to expand and invest.

### **3.4 INTERNATIONAL EXPERIENCE WITH SOLAR ENERGY PLANTS**

#### **3.4.1 Introduction**

The aim of this section is to provide a brief overview of some of the environmental issues / impacts associated with solar energy facilities based on international experience. This does not necessarily imply that these impacts are associated with the proposed Kabi Energy PVSEF, specifically given that the proposed facility is a PVSEF as opposed to a Concentrating Solar Power (CSP) plant. In this regard the majority of the international experience is based on solar thermal plants as opposed to PVSEFs. In addition, a number of the issues, such as the health and safety issues fall outside the scope of the EIA and are related to the manufacturing process. However, for the sake of completeness they are briefly discussed below.

All renewable energy technologies are not appropriate to all applications or locations, however. As with conventional energy production, there are environmental issues to be considered. Solar power plants reduce the environmental impacts of combustion used in fossil fuel power generation such as greenhouse gas and other air pollution emissions. However, concerns have been raised over land disturbance, visual impacts, and the use of potentially hazardous materials in some systems, specifically in the case of CSP plants.

The section below provides a summary of potential issues, including social issues typically associated with solar energy plants, specifically CSP plants. The key issues listed below are largely sourced from the Solar Energy Development Programmatic Environmental Impact Statement (PEIS) being prepared by the U.S. Department of Energy, Energy Efficiency and Renewable Energy Program and the U.S. Department of the Interior, Bureau of Land Management (the Agencies) in order to assess environmental impacts associated with the development and implementation of agency-specific programs that would facilitate environmentally responsible utility-scale solar energy development in six western states (Arizona, California, Colorado, New Mexico, Nevada, and Utah) (<http://solareis.anl.gov/guide/environment/index.cfm>). The findings of the literature review also indicated that there do not appear to be any national or international guidelines for the siting and establishment of solar energy plants.

#### **3.4.2 Health and safety issues**

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of PV cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing photovoltaic modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in quality or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks

essentially concern workers at the cell manufacturing plant and therefore this issue falls outside the scope of the EIA.

### **3.4.3 Land disturbance and land use impacts**

Large, utility-scale CSP plants require approximately one square kilometre of land for every 20-60 megawatts (MW) generated-poses. The large arrays of solar collectors may interfere with natural sunlight, rainfall, and drainage, which could have a variety of effects on plants and animals. Solar facilities may also interfere with existing land uses, such as grazing. In some instances homesteads may be affected which in turn may require the affected parties to be relocated. Proper siting decisions can help to avoid land disturbance and land use impacts. In addition, new solar installation sites are often levelled, sprayed with weed control chemicals and shaded. Each one of these steps will change the dynamics of the original function of the land with respect to plant and animal inhabitants.

However, it is important to bear in mind that these impacts are not unique to solar power plants. Generating electricity from coal and uranium usually requires as much or more land per unit of energy delivered if the land lost to mining is taken into account. CSP plants (like most conventional power plants) also require cooling water, which may be costly or scarce in desert areas.

PVSEFs, such as proposed for the Kabi Energy PVSEF, on the other hand, do not require cooling water and as such are more suited to areas where water is a scarce resource.

### **3.4.4 Visual impacts**

Due to their size, and the presence of numerous highly geometric and sometimes highly reflective surfaces, solar energy facilities may create visual impacts. This concern applies to both CSP and PVSEFs. However, being visible does not necessarily imply that they are visually intrusive. Aesthetic issues are by their nature highly subjective. Proper siting decisions can help to avoid aesthetic impacts to the landscape.

### **3.4.5 Carbon Footprint**

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. Energy is required to manufacture and install solar components, and any fossil fuels used for this purpose will generate emissions. It is therefore important to compare how much fossil energy input is required for solar systems compared to the fossil energy consumed by comparable conventional energy systems. Although this varies depending upon the technology and climate, studies have found that the energy balance for solar energy facilities is generally favourable and is improving with each successive generation of technology, including PVSEF technology.

### **3.4.6 Other issues identified in the literature**

CSP systems can potentially cause interference with aircraft operations if reflected light beams become misdirected into aircraft pathways. In theory this also applies to PV plants, although the probability is substantially lower than in the case of CSP plants. Operation of solar energy facilities, especially CSP facilities, involves high temperatures that may also pose an environmental or safety risk to workers. Like all

electrical generating facilities, solar facilities produce electric and magnetic fields that can interfere with communication equipment, TVs and radios. Construction and decommissioning of utility-scale solar energy facilities would involve a variety of possible impacts normally encountered in construction/decommissioning of large-scale industrial facilities. If new electric transmission lines or related facilities were needed to service a new solar energy development, construction, operation, and decommissioning of the transmission facilities could also cause a variety of environmental impacts.

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## **SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES**

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### **4.1 INTRODUCTION**

Section 4 identifies the key social issues identified during the SIA study. The identification of social issues was based on:

- Review of project related information, including other specialist studies;
- Interviews with key interested and affected parties;
- Experience of the authors of the area and the local conditions;
- Experience with similar projects.

In identifying the key issues the following assumption is made:

- The area identified for the proposed PVSEF meets the technical criteria required for such facilities.

### **4.2 IDENTIFICATION OF KEY SOCIAL ISSUES**

The key social issues identified during the SIA can be divided into:

- The policy and planning related issues
- Local, site-specific issues

The local site-specific issues can in turn be divided into construction and operational related issues. These issues are discussed and assessed below. The potential impacts associated with the associated power line routes are also assessed.

### **4.3 POLICY AND PLANNING ISSUES**

As indicated in Section 1.6, legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents.

The review of the relevant planning and policy documents was undertaken as a part of the SIA. The key documents reviewed included:

- The National Energy Act (2008)
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998)
- The White Paper on Renewable Energy (November 2003)
- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Frances Baard District Municipality Integrated Development Plan (2007-2011);
- Sol Plaatje Local Municipality Integrated Development Plan (2007-2011);

The findings of the review indicated that solar energy was strongly supported at a national and local level. At a national level the White Paper on Energy Policy (1998) notes:

- Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future;
- The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly **solar** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

The IRP 2010 also allocates 43% of new energy generation facilities in South Africa to renewables.

At a provincial level the NCPGDP notes that availability of inexpensive energy is a key requirement in order to promote economic growth in the Northern Cape. The NCGDS goes on to indicate that "the development of energy sources such as **solar energy**, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape".

Based on this it is reasonable to assume that the establishment of the Kabi Energy PVSEF is supported. At a local level the SPLM IDP refers to the development of Kimberley as a Solar City and the Northern Cape Province as the Solar Province of South Africa.

The findings of the review of the relevant policies and documents pertaining to the energy sector therefore indicate that solar energy and the establishment of PVSEF are supported at a national, provincial, and local level. It is therefore the opinion of the authors that the establishment of a PVSEF on the proposed site is supported by national, provincial and local policies and planning guidelines.

#### **4.4 SOCIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE**

The key social issues associated with the construction phase include:

##### **Potential positive impacts**

- Creation of employment and business opportunities and opportunity for skills development and on-site training

##### **Potential negative impacts**

- Impacts associated with the presence of construction workers on site
- Potential risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site
- Increased risk of veld fires associated with construction-related activities
- Impact of heavy vehicles, including damage to roads, safety, noise and dust
- Potential loss of grazing land associated with construction-related activities.

Annexure C contains the management plan for addressing social impacts.

#### **4.4.1 Creation of employment and business opportunities**

Based on the information provided by Kabi Energy, the construction phase is expected to extend over a period of 10-12 months and create approximately 200 employment opportunities, depending on the final design. The work associated with the construction phase will be undertaken by contractors and will include the establishment of the PVSEF and the associated components, including, internal access roads, services and power lines.

Based on information provided by Kabi Energy it is anticipated that approximately 80% (160) of the employment opportunities will be available to low (construction labourers, security staff etc.), 10% (20) for semi-skilled (drivers, equipment operators etc.) and 10 % (20) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the skilled and semi-skilled opportunities are likely to be associated with the contractors appointed to construct the proposed PVSEF and associated infrastructure. In this regard the majority of contractors tend to use their own staff and this may limit the potential for direct employment opportunities for locals during the construction phase. However, the majority of the low skilled employment opportunities are likely to be taken up by members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community.

Based on information provided by Kabi Energy the capital expenditure is anticipated to be in the region of R 600 million for the proposed 19 MWp facility. In terms of business opportunities for local companies, the expenditure of these sums during the construction phase will create business opportunities for the regional and local economy. However, given the technical nature of the project and high import content associated with PVSEF the opportunities for the local SPLM economy and the City of Kimberley are likely to be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kimberley. Implementing the enhancement measures listed below can enhance these opportunities.

The implementation of the proposed enhancement measures listed below would enable the establishment of the proposed PVSEF to support co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. In this regard the NCNCPGDS highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. The proposed PVSEF therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province, specifically in the SPLM.

The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport and security. All of the non-local construction workers will be accommodated in Kimberly, which will create opportunities for local hotels and B&Bs. In addition, a proportion of the total wage bill earned by construction workers over the 10-12 month construction phase is also likely to be spent in the regional and local economy. Based on information from other renewable energy facilities, the total wage bill for the 10-12 month construction phase will be in the region of R 12-15 million. The injection of income into the area in the form of rental for accommodation and wages will create

opportunities for local businesses in Kimberley. The benefits to the local economy will however be confined to the construction period (10-12 months).

In terms of training, the contractors are likely to provide on-site training and skills development opportunities. However, the majority of benefits are likely to accrue to personnel employed by the relevant contractors. In the absence of specific commitments from the developer to employ local contractors the potential for meaningful skills development and training for members from the local communities are likely to be limited. In addition, Kabi Energy has indicated that solar PV technology is simple and modular in form and there is limited scope for skills transfers during the construction phase of the project.

The hospitality industry in the local towns is also likely to benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

**Table 4.1: Impact assessment of employment and business creation opportunities during the construction phase**

<b>Nature:</b> Creation of employment and business opportunities during the construction phase		
	<b>Without Mitigation</b>	<b>With Enhancement</b>
<b>Extent</b>	Local – Regional (2) (Rated as 2 due to potential opportunities for local communities and businesses)	Local – Regional (3) (Rated as 3 due to potential opportunities for local communities and businesses)
<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Significance</b>	Low (28)	Medium (32)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	N/A	N/A
<b>Can impact be enhanced?</b>	Yes	
<b>Enhancement :</b> See below		
<b>Cumulative impacts:</b> Opportunity to up-grade and improve skills levels in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.		
<b>Residual impacts:</b> Improved pool of skills and experience in the local area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.		

### **Assessment of No-Go option**

There is no impact as it maintains the current status quo. The potential employment and economic benefits associated with the proposed PVSEF would therefore be forgone. The potential opportunity costs in terms of the capital expenditure, employment, skills development, and opportunities for local business are therefore regarded as a negative.

### **Recommended enhancement measures**

In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

#### **Employment**

- Where reasonable and practical, Kabi Energy's EPC service providers should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contractors that are compliant with Black Economic Empowerment (BEE) criteria;
- Before the construction phase commences, the contractors appointed by Kabi Energy should meet with representatives from the SPLM Municipality to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that Kabi Energy intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

#### **Business**

- Kabi Energy should seek to develop a database of local companies, specifically BEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- Where possible, Kabi Energy should assist local BEE companies to complete and submit the required tender forms and associated information. In this regard Kabi Energy have indicated that they are in discussions with a number of potential contractors and this issue will be raised;
- SPLM, in conjunction with the local Chamber of Commerce and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

#### 4.4.2 Presence of construction workers in the area

While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to the potential behaviour of male construction workers, including:

- An increase in alcohol and drug use
- An increase in crime levels
- The loss of girlfriends and or wives to construction workers
- An increase in teenage and unwanted pregnancies
- An increase in prostitution
- An increase in sexually transmitted diseases (STDs)

Based on the information provided by Kabi Energy approximately 80% of the workforce during the construction phase will consist of low skilled workers. As indicated above the majority of low skilled workers can be sourced from the local area. The potential impact associated with presence of construction workers is therefore not regarded as a significant social issue. In this regard the construction of the proposed PVSEF will be no different than the construction of a small scale residential development.

**Table 4.2: Assessment of impact of construction workers on local communities**

<b>Nature:</b> Potential impacts on family structures and social networks associated with the presence of construction workers		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Very Short term (1)	Very Short term (1)
<b>Magnitude</b>	Low (4)	Very Low (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (18)	Low (12)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	N/A	N/A
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impact be mitigated?</b>	Yes	
<b>Mitigation:</b> See below		
<b>Cumulative impacts:</b> Not regarded as relevant due to small number of construction workers and fact that majority will be sourced locally.		
<b>Residual impacts:</b> See cumulative impacts.		

### **Assessment of No-Go option**

There is no impact as it maintains the current status quo. The potential positive impacts on the local economy associated with the additional spending by construction workers in the local economy will also be lost.

### **Recommended mitigation measures**

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- Where possible, Kabi Energy should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks;
- Kabi Energy and the contractor should develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation;
- Kabi Energy and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. This will make it possible to manage the potential impacts effectively.

#### **4.4.3 Increased risk of stock theft and poaching and damage to farm infrastructure**

The presence of construction workers on the site increases the potential risk of stock theft and poaching. In this regard the farm adjacent to the site is currently managed a game farm. Stock and game losses may also result from gates being left open and/or fences being damaged.

**Table 4.3: Assessment of impact of stock theft and damage to farm infrastructure**

<b>Nature:</b> Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (21)	Low (18)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, compensation paid for stock losses etc.	Yes, compensation paid for stock losses etc.
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impact be mitigated?</b>	Yes	Yes
<b>Mitigation:</b> See below		
<b>Cumulative impacts:</b> No, provided losses are compensated for		
<b>Residual impacts:</b> See cumulative impacts.		

#### **Assessment of No-Go option**

There is no impact as it maintains the current status quo.

#### **Recommended mitigation measures**

The mitigation measures that can be considered to address the potential impact on livestock, game, and farm infrastructure include:

- Kabi Energy should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in an agreement to be signed between Kabi Energy, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below);
- The EMP should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;
- Kabi Energy and the contractor should develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted, specifically consequences of stock theft and trespassing on adjacent farms. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation;

- Contractors appointed by Kabi Energy should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct;
- The housing of construction workers on the site should be limited to security personnel.

#### 4.4.4 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that in turn pose a threat to the livestock, wildlife, and structures in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened.

- The potential risk of grass fires is heightened by windy conditions in the area, specifically during the dry, winter months.
- The adjacent property is managed as a game farm. The loss of grazing due to grass fires linked to construction related activities would therefore impact negatively on the operation of the game farm.

The findings of the SIA however indicate that the potential increase risk posed by grass fires can be effectively managed. The significance of this issue is therefore rated to be low.

**Table 4.4: Assessment of impact of increased risk of grass fires**

<b>Nature:</b> Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (3) (Rated as 3 due to potential severity of impact on adjacent game farming operations)	Local (2)
<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Moderate (6)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Medium (30)	Low (21)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, compensation paid for game and stock losses etc.	
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impact be mitigated?</b>	Yes	
<b>Mitigation:</b> See below		
<b>Cumulative impacts:</b> No, provided losses are compensated for.		
<b>Residual impacts:</b> See cumulative impacts.		

### **Assessment of No-Go option**

There is no impact as it maintains the current status quo.

### **Recommended mitigation measures**

As indicated above, Kabi Energy or its EPC contractor should enter into an agreement with De Beers whereby the company will compensate for damages. This includes losses associated with grass fires. In this regard Kabi Energy's agreement with De Beers also ensures that a 5 metre firebreak boundary will be maintained during the construction and operational phase of the PVSEF. In addition, the potential increased risk of grass fires can be effectively mitigated. The detailed mitigation measures are outlined in the EMP for the construction and operation phases. The aspects that should be covered include:

- Contractor to ensure that open fires on the site for cooking or heating are not allowed except in designated areas;
- Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months;
- Contractor to provide adequate fire fighting equipment on-site;
- Contractor to provide fire-fighting training to selected construction staff;
- As per the conditions of the Code of Good Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire fighting costs borne by farmers and local authorities.

In addition the landowner should also ensure that they join the local fire protection agency.

#### **4.4.5 Impact of construction vehicles**

The movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust, and safety impacts for other road users and local residents in the area. However, the findings of the SIA indicate that the social impacts associated with the movement of construction related traffic are likely to be low. This is due to the relatively small size of the proposed PVSEF, the short duration of the construction phase and the ability to mitigate the potential impacts effectively (see below)

**Table 4.5: Assessment of the impacts associated with construction vehicles**

<b>Nature:</b> Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Very Short Term (1)	Very Short Term (1)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (21)	Low (12)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	No
<b>Can impact be mitigated?</b>	Yes	
<b>Mitigation:</b> See below		
<b>Cumulative impacts:</b> If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.		
<b>Residual impacts:</b> See cumulative impacts		

**Assessment of No-Go option**

There is no impact as it maintains the current status quo.

**Recommended mitigation measures**

Potential impacts associated with heavy vehicles and dust can be effectively mitigated. The aspects that should be covered include:

- Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should not take place over weekends.
- The contractor should ensure that damage caused to public roads by the construction related activities, including heavy vehicles, is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor;
- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;
- All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

**4.4.6 Damage to and loss of agricultural land**

The activities associated with the construction phase have the potential to damage farmland and result in a loss of land available for future agricultural use. The

significance of the impacts is, however, mitigated by the fact that the majority of the site has been historically used by De Beers as a tailings dump for mine tailings. The tailings material is currently being removed from the site and being reprocessed. The impact on farmland associated with the construction phase can also be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Recommended mitigation measures are outlined below.

**Table 4.6: Assessment of impact on farmland due to construction related activities**

<b>Nature:</b> The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the PVSEF and power lines will damage farmlands and result in a loss of farmlands for future farming activities.		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (1)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Highly Probable (4)	Highly Probable (4)
<b>Significance</b>	Medium (36)	Low (16)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, if disturbed areas fully rehabilitated	Yes, if disturbed areas fully rehabilitated
<b>Irreplaceable loss of resources?</b>	No, if disturbed areas fully rehabilitated	No, if disturbed areas fully rehabilitated
<b>Can impact be mitigated?</b>	Yes, however, loss of agricultural land cannot be avoided	Yes, however, loss of agricultural land cannot be avoided
<b>Mitigation:</b> See below		
<b>Cumulative impacts:</b> Overall loss of agricultural land could affect food production. However, area has in the past been used as an area for disposing of mine tailings. In addition, the disturbed areas can be rehabilitated.		
<b>Residual impacts:</b> See cumulative impacts.		

#### **Assessment of No-Go option**

There is no impact as it maintains the current status quo.

#### **Recommended mitigation measures**

The potential impacts associated with damage to and loss of farmland can be effectively mitigated. The aspects that should be covered include:

- The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;

- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up the Environmental Consultants appointed to undertake the EIA (Savannah Environmental);
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

#### **4.5 SOCIAL IMPACTS ASSOCIATED WITH OPERATIONAL PHASE**

The key social issues affecting the operational phase include:

##### **Potential positive impacts**

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of renewable energy infrastructure.

##### **Potential negative impacts**

- The visual impacts and associated impact on sense of place;
- Impact on tourism.

Annexure C contains the management plan for the addressing social impacts.

##### **4.5.1 Creation of employment and business opportunities**

Based on information provided by Kabi Energy the proposed PVSEF is likely to employ approximately 54 full time employees over the 25-30 year operational phase. Of this total, 52 would be for low-skilled workers, namely cleaners (32) and security (20). The majority of the low-skilled employment opportunities are likely to be taken up by HD members of the local community. The proposed facility will therefore create potential employment opportunities in the SPLM. Kabi Energy have also indicated that the 2 skilled personnel (qualified electricians) associated with the operational phase will receive training both on-site and in PVSEFs in Spain. This commitment supports the strategic goals of promoting local employment and skills development contained in the SPLM IDP.

The annual expenditure during the operational phase would be in the region of R 3 million. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy, which will benefit local businesses in these towns. The benefits to the local economy will extend over the 30-year operational lifespan of the project.

The local hospitality industry in Kimberley is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations.

**Table 4.7: Impact assessment of employment and business creation opportunities**

<b>Nature:</b> Creation of employment and business opportunities associated with the operational phase		
	<b>Without Mitigation</b>	<b>With Enhancement</b>
<b>Extent</b>	Local and Regional (2)	Local and Regional (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Medium (30)	Medium (33)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be enhanced?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area		
<b>Residual impacts:</b> See cumulative impacts		

#### **Assessment of No-Go option**

There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the loss of employment and skills and development training would be lost which would also represent a negative impact.

#### **Recommended enhancement measures**

The enhancement measures listed in Section 4.4.1, i.e. to enhance local employment and business opportunities during the construction phase, also apply to the operational phase.

Kabi Energy has also entered into discussions with the landowner, De Beers, and the Industrial Development Corporation (IDC) on identifying community groupings and Corporate Sustainability Investment (CSI) initiatives in the Kimberley region. In addition, all rental payments paid by Kabi Energy to De Beers for use of the land during the operational period will be directed towards CSI spend.

#### **4.5.2 Development of clean, renewable energy infrastructure**

South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions (Cape Times, 15 November 2007). The establishment of a clean, renewable energy facility will therefore reduce, albeit minimally, South Africa's reliance on coal-generated energy and the generation

of carbon emissions into the atmosphere. The overall contribution to South Africa's total energy requirements of the proposed PVSEF is relatively small. However, the 19 MW produced will help to offset the total carbon emissions associated with energy generation in South Africa. Given South Africa's reliance on Eskom as a power utility, the benefits associated with an IPP based on renewable energy are regarded as an important contribution.

**Table 4.8: Development of clean, renewable energy infrastructure**

<b>Nature:</b> Promotion of clean, renewable energy		
	<b>Without Mitigation</b>	<b>With Mitigation</b> (The provision of renewable energy infrastructure is in itself a mitigation measure)
<b>Extent</b>	Local, Regional and National (4)	Local, Regional and National (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Probability</b>	Highly Probable (4)	Highly Probable (4)
<b>Significance</b>	Medium (48)	Medium (48)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	Yes, impact of climate change on ecosystems	
<b>Can impact be mitigated?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
<b>Residual impacts:</b> See cumulative impacts		

#### **Assessment of No-Go option**

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. This would represent a negative opportunity cost.

#### **Recommended mitigation measures**

The establishment of the proposed facility is a mitigation measure in itself. In order to maximize the benefits of the proposed project Kabi Energy should:

- Use the project to promote and increase the contribution of renewable energy to the national energy supply;
- Maximize the public's exposure to the project via an extensive communication and advertising programme;

#### **4.5.3 Visual impact and impact on sense of place**

The components associated with the proposed facility will have a visual impact and, in so doing, impact on the landscape and rural sense of the place of the area. As

indicated previously, the NCPGDS does indicate that the province does have the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects not impact on visual character and sense of place of the landscape.

However, in the case of the proposed Kabi Energy PVSEF the site is located within close proximity of the City of Kimberley in an area that has been used as a mine tailings dump. The visual impacts associated with the proposed PVSEF and associated impacts on the areas sense of place are therefore likely to be of low significance.

The key findings of the specialist visual impact assessment (VIA) (MetroGIS, July 2011) indicate that the greater region has some scenic value, but the study area itself is largely transformed by the urban centre of Kimberley, the mining and industrial land uses, and the amount of transportation and electrical infrastructure already present in close proximity to the proposed site.

In this respect, it is not likely that the facility will be visible to observers within Kimberley, due to the high VAC of the buildings and infrastructure. Similarly, the visual impact on urban open spaces within Kimberley is expected to be nil due to the visual absorption capacity of the urban environment.

It is envisaged, however, that the proposed facility would be visible to observers travelling along roads, residing in homesteads and farmsteads or visiting the area (i.e. Kamfers Dam), especially within 5km of the site. The specific findings of the VIA are summarised below.

**Potential visual impact on users of national and secondary roads in close proximity to the proposed facility**

Visual impacts on users of national and secondary roads within a radius of 2.5km of the proposed facility are expected to be of **high** significance. No mitigation is proposed.

**Potential visual impact on residents of homesteads and farmsteads in close proximity to the proposed facility**

The visual impact on residents of homesteads and farmsteads within a radius of 2.5km of the proposed facility are expected to be of **moderate** significance. It is noteworthy that the context of these homesteads and farmsteads (i.e. the visual clutter of the mining, industry, railway line and power lines) will offer some absorption of the visual impact. No mitigation is proposed.

**Potential visual impact on sensitive visual receptors (users of roads and residents of homesteads and farmsteads) within the region**

The visual impact users of national, arterial and secondary roads and on residents of rural homesteads and farmsteads within the region (i.e. beyond the 2.5km radius), is expected to be of **low** significance. No mitigation is proposed.

**Potential visual impact on conservation areas within the region**

Within the region, the visual impact on visitors to Kamfers Dam and Important Bird Areas (i.e. IBA031 and IBA032) as well as users of the Kamfers Dam Golf Course to the east of the site is expected to be of **moderate** significance. No mitigation is proposed.

**Potential visual impact of the proposed facility on the visual character and sense of place of the region**

The anticipated visual impact of the facility on the regional visual character, and by implication, on the sense of place, is expected to be of **low** significance. No mitigation is proposed.

**Table 4.9: Visual impact and impact on sense of place**

<b>Nature:</b> Visual impact associated with the proposed solar facility and the potential impact on the areas rural sense of place.		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (1)	Local (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Highly Probable (4)	Highly Probable (4)
<b>Significance</b>	Low (28)	Low (28)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, solar facility can be removed.	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be mitigated?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Potential impact on current rural sense of place		
<b>Residual impacts:</b> See cumulative impacts		

**Assessment of No-Go option**

There is no impact as it maintains the current status quo.

**Recommended mitigation measures**

The recommendations contained in the VIA should be implemented.

**4.5.4 Impact on tourism**

The NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile ecosystems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and eco-tourism destination in South Africa. Therefore caution must be taken to ensure that the development of large renewable energy projects, do not affect the tourism potential of the Province.

However, in the case of the proposed Kabi Energy PVSEF, the site is located within close proximity of the City of Kimberley in an area that has been used as a mine tailings dump. The site is therefore unlikely to have a negative impact on tourism both in terms of the Northern Cape and the City of Kimberley. The location of the site also address concerns raised by representatives from WESSA regarding the potential

impact of solar energy facilities on natural environment and the tourism potential of the Northern Cape Province. The significance of this issue is therefore rated as low negative. The establishment of a PVSEF close to the City of Kimberley may even have the potential attract visitors to the site and could be used to highlight the SPLM's commitment to solar energy. This would represent a potential positive impact. The significance of this issue is rated as low positive.

The findings of the VIA support the findings of the SIA in that the anticipated visual impact of the facility on existing tourist routes, as well as on the tourism value and potential of the region takes cognisance of the visual status quo of the mining and industrial areas surrounding the site, and is expected to be of **low** significance.

**Table 4.10: Impact on tourism**

<b>Nature:</b> Potential impact of the PVSEF on local tourism		
	<b>Without Mitigation</b>	<b>With Enhancement / Mitigation</b>
<b>Extent</b>	Local (2)	Local (2)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Low (2)	Low (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (24) (Applies to both – and +)	Low (24) (Applies to both – and +)
<b>Status</b>	Negative  Positive (Potential to highlight SPLMs commitment to solar energy)	Negative  Positive (Potential to highlight SPLMs commitment to solar energy)
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be enhanced?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Potential positive impact on tourism in the SPLM.		
<b>Residual impacts:</b> See cumulative impacts		

#### **Assessment of No-Go option**

The No-Development option would represent a lost opportunity to create a facility that has the potential to attract visitors to the area. This would represent a negative opportunity cost.

#### **Recommended enhancement measures**

In terms of mitigating the visual impacts, it is virtually impossible to hide the facility. The impact on the sense of place of the area cannot therefore be effectively mitigated. In terms of efforts to enhance the proposed benefits to tourism:

- Kabi Energy should liaise with representatives from the SPLM and local tourism representatives to raise awareness of the proposed facility;

- Kabi Energy, in consultation with SPLM, should investigate the option of establishing a renewable energy interpretation centre at entrance to the site. The centre should include a viewing area where passing visitors can stop and view the site.

#### 4.6 ASSESSMENT POWER LINE OPTIONS

The proposed facility includes the establishment of new substation on the site connecting to either the existing 88 or 132kV transmissions that feed into the Kenilworth substation that is located ~ 6 km south east of the site. The new substation will be located adjacent to the existing transmission line and a maximum of 2 line towers will be required to connect the substation with the existing transmission lines. The social impacts associated with the required transmission lie will be low. This is due to the short distance (150m) required and the existence of existing transmission lines next to the site.

**Table 4.11: Assessment of transmission line options**

<b>Nature:</b> Potential visual impact and impact on sense of place associated with power lines		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local (2)	Local (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (24)	Low (21)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be mitigated?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Limited visual and impact on sense of place		
<b>Residual impacts:</b> See cumulative impacts		

#### Assessment of No-Go option

There is no impact as it maintains the current status quo.

#### Recommended mitigation measures

The recommendations contained in the VIA should be implemented. The measures listed above to address the potential impacts associated with the construction phase also apply to the construction of the power line.

#### 4.7 POTENTIAL HEALTH IMPACTS

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of photovoltaic cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing photovoltaic modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

#### 4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

As indicated above, South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions (Cape Times, 15 November 2007).

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

**Table 4.12: Assessment of no-development option**

<b>Nature:</b> The no-development option would result in the lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local-International (5)	Local-International (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Probability</b>	Highly Probable (4)	Highly Probable (4)
<b>Significance</b>	High (60)	High (60)
<b>Status</b>	Negative	Positive
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	Yes, impact of climate change on ecosystems	
<b>Can impact be mitigated?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
<b>Residual impacts:</b> See cumulative impacts		

### Recommended enhancement measures

The proposed facility should be developed and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented. However, the impact of large solar facilities on the sense of place and landscape are issues need to be addressed in the location, design and layout of the proposed plant.

## 4.9 ASSESSMENT OF CUMULATIVE IMPACTS

There are two solar projects currently being developed in the vicinity of the City of Kimberley. Mainstream Renewable Power is developing a CSP/PV project to the north of us and ACSA PV is developing a small project near the Kimberley Airport. However, due to the proximity of the proposed Kabi PVSEF to Kimberley and the areas historic use as a mine tailings dump, the potential cumulative impacts in terms of impact on sense of place are regarded as low.

**Table 4.13: Cumulative impacts on sense of place and the landscape**

<b>Nature:</b> Visual impacts associated with the establishment of more than one PVSEF and the potential impact on the areas rural sense of place and character of the landscape.		
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	Local and regional (2)	Local and regional (2)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Probability</b>	Probable (3)	Probable (3)
<b>Significance</b>	Low (24)	Low (24)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes. Solar energy plant components and other infrastructure can be removed.	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impact be mitigated?</b>	Yes	
<b>Enhancement:</b> See below		
<b>Cumulative impacts:</b> Impact on other activities whose existence is linked to linked to rural sense of place and character of the area, such as tourism, bird watching, and hunting.		
<b>Residual impacts:</b> See cumulative impacts		

### Assessment of No-Go option

There is no impact as it maintains the current status quo.

### Recommended mitigation measures

No recommended mitigation measures

#### **4.10 ASSESSMENT OF DECOMMISSIONING PHASE**

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25 - 30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

In addition, the social impacts associated with final decommissioned are likely to be limited due to the relatively small number of permanent employees (62) affected. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

##### **Recommended mitigation measures**

In terms of future rehabilitation of the site, Kabi Energy has established a mechanism that will ensure that sufficient funds are available to cover costs associated with decommissioning of the PVSEF. In addition, as owner of the mining right, De Beers has ultimate responsibility for the rehabilitation site. The following mitigation measures are also recommended:

- Kabi Energy should investigate the option of relocating employees to other solar facilities when the Kabi Energy PVSEF is decommissioned;
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.

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## **SECTION 5: KEY FINDINGS AND RECOMMENDATIONS**

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### **5.1 INTRODUCTION**

Section 5 lists the key findings of the study and recommendations. These findings are based on:

- A review of the issues identified during the Scoping Process;
- A review of key planning and policy documents pertaining to the area;
- Semi-structured interviews with interested and affected parties;
- A review of social and economic issues associated with similar developments;
- A review of selected specialist studies undertaken as part of the BA;
- A review of relevant literature on social and economic impacts;
- The experience of the authors with other solar energy projects in South Africa.

### **5.2 SUMMARY OF KEY FINDINGS**

The key findings of the study are summarised under the following sections:

- Fit with policy and planning;
- Construction phase impacts;
- Operational phase impacts;
- Cumulative impacts;
- Decommissioning phase impacts;
- No-development option.

The section also comments on the potential health impacts associated with solar facilities.

#### **5.2.1 Policy and planning issues**

The key documents reviewed included:

- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Frances Baard District Municipality Integrated Development Plan (2007-2011);
- Sol Plaatje Local Municipality Integrated Development Plan (2007-2011).

The findings of the review indicated that solar energy is strongly supported at a national, provincial, and local level. Based on this it is reasonable to assume that the establishment of the proposed Kabi Energy PVSEF is supported.

## 5.2.2 Construction phase

The key social issues associated with the construction phase include:

### Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Based on the information provided by Kabi Energy the construction phase is expected to extend over a period of 10-12 months and create approximately 200 employment opportunities. Of this total approximately 80% (160) of the employment opportunities will be available to low (construction labourers, security staff etc.), 10% (20) for semi-skilled (drivers, equipment operators etc.) and 10 % (20) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of the low skilled employment opportunities are likely to be taken up by members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members from the local community.

The capital expenditure associated with the construction of a 19 MWp PVSEF is anticipated to be in the region of R 600 million. In terms of business opportunities for local companies, the expenditure of these sums during the construction phase will create business opportunities for the regional and local economy. However, given the technical nature of the project and high import content associated with PVSEF the opportunities for the local SPLM economy and the City of Kimberley are likely to be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kimberley. In addition, a proportion of the total wage bill earned by construction workers over the 10-12 month construction phase is also likely to be spent in the regional and local economy. Based on information from other renewable energy facilities, the total wage bill for the 10-12 month construction phase will be in the region of R 12-15 million. The benefits to the local economy will however be confined to the construction period (10-12 months).

The establishment of the proposed PVSEF would also create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province, specifically in the SPLM. The need for such cooperation is highlighted in the NCPGDS.

### Potential negative impacts

- Influx of construction workers employed on the project;
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with construction workers;
- Increased risk of veld fires associated with construction related activities;
- Impact of heavy vehicles, including damage to roads, safety, noise and dust;
- Loss of agricultural land associated with construction related activities.

The significance of the potential negative impacts with mitigation was assessed to be of Low significance. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented.

Table 5.1 summarises the significance of the impacts associated with the construction phase.

**Table 5.1: Summary of social impacts during construction phase**

<b>Impact</b>	<b>Significance No Mitigation</b>	<b>Significance With Mitigation</b>
<b>Creation of employment and business opportunities</b>	Low (Positive impact)	Medium (Positive impact)
<b>Presence of construction workers and potential impacts on family structures and social networks</b>	Low (Negative impact)	Low (Negative impact)
<b>Risk of stock theft, poaching and damage to farm infrastructure</b>	Low (Negative impact)	Low (Negative impact)
<b>Risk of grass fires</b>	Medium (Negative impact)	Low (Negative impact)
<b>Impact of heavy vehicles and construction activities</b>	Low (Negative impact)	Low (Negative impact)
<b>Loss of agricultural land</b>	Medium (Negative impact)	Low (Negative impact)

### 5.2.3 Operational phase

The key social issues affecting the operational phase include:

#### **Potential positive impacts**

- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training;
- The establishment of infrastructure to generate renewable energy.

Based on information provided by Kabi Energy the proposed PVSEF is likely to employ approximately 54 full time employees over the 25-30 year operational phase. Of this total 52 would be for low-skilled workers, namely cleaners (32) and security (20). The majority of the low-skilled employment opportunities are likely to be taken up by HD members of the local community. The proposed facility will therefore create potential employment opportunities in the SPLM. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the local economy. The benefits to the local economy will extend over the 25-30 year operational lifespan of the project.

Kabi Energy have also indicated that the 2 skilled personnel (qualified electricians) associated with the operational phase will be given training on-site and on PVSEFs in Spain. This commitment supports the strategic goals of promoting local employment and skills development contained in the SPLM IDP.

The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive High social benefit for society as a whole.

### Potential negative impacts

- The visual impacts and associated impact on sense of place and the landscape;
- Impact on tourism.

The proposed Kabi Energy PVSEF site is located within close proximity of the City of Kimberley in an area that has been used as a mine tailings dump. The visual impacts associated with the proposed PVSEF and associated impacts on the areas sense of place and tourism are therefore likely to be of low significance.

The significance of the impacts associated with the operational phase are summarised in Table 5.2.

**Table 5.2: Summary of social impacts during operational phase**

<b>Impact</b>	<b>Significance No Mitigation</b>	<b>Significance With Mitigation</b>
<b>Creation of employment and business opportunities</b>	Medium (Positive impact)	Medium (Positive impact)
<b>Promotion of renewable energy projects</b>	Medium (Positive impact)	Medium (Positive impact)
<b>Visual impact and impact on sense of place</b>	Low (Negative impact)	Low (Negative impact)
<b>Impact on tourism</b>	Low (Positive and Negative)	Low (Positive and Negative)

#### 5.2.4 Assessment of cumulative impacts

There are two solar projects currently being developed in the vicinity of the City of Kimberley. Mainstream Renewable Power is developing a CSP/PV project to the north of us and ACSA PV is developing a small project near the Kimberley Airport. However, due to the proximity of the proposed Kabi PVSEF to Kimberley and the areas historic use as a mine tailings dump, the potential cumulative impacts in terms of impact on sense of place are regarded as low.

#### 5.2.5 Transmission line options

The findings of the SIA indicate that the impacts associated with the proposed overhead power line will be low.

#### 5.2.6 Potential health impacts

The primary environmental, health, and safety issues associated with solar energy involve how they are manufactured, installed, and ultimately disposed of. In particular, the manufacturing of PV cells often requires hazardous materials such as arsenic and cadmium. Even relatively inert silicon, a major material used in solar cells, can be hazardous to workers if it is breathed in as dust. Workers involved in manufacturing PV modules and components must consequently be protected from exposure to these materials. However, none of these potential hazards is much different in nature and or magnitude from the innumerable hazards people face routinely in an industrial society. Through effective regulation, the dangers can very likely be kept at a very low level. In addition, the relevant risks essentially concern

workers at the cell manufacturing plant and therefore fall outside the scope of the EIA.

### **5.2.7 Assessment of no-development option**

The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producers of carbon emissions in the world, this would represent a High negative social cost.

The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed PVSEF. This also represents a negative social cost.

### **5.2.8 Decommissioning phase**

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the PVSEF's decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 25-30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning.

When and if the proposed PVSEF is finally decommissioned, the impacts are likely to be limited due to the relatively small number of permanent employees (54) affected. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

In terms of future rehabilitation of the site, Kabi Energy has established a mechanism that will ensure that sufficient funds are available to cover costs associated with decommissioning of the PVSEF. In addition, as owner of the mining right, De Beers has ultimate responsibility for the rehabilitation site.

## **5.3 CONCLUSIONS AND RECOMMENDATIONS**

The findings of the SIA indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. While these opportunities are likely to be limited, the mitigation measures listed in the report should be implemented in order to enhance them. In addition the potential visual and sense of place impacts associated with the proposed PVSEF are low. This is due to the site's location on an area used as a mine tailings dump and within close proximity of the City of Kimberley. The proposed site is therefore well suited for the establishment of a PVSEF.

Kabi Energy has also entered into discussions with the landowner, De Beers, and the Industrial Development Corporation (IDC) on identifying community groupings and Corporate Sustainability Investment (CSI) initiatives in the Kimberley region. In addition, all rental payments paid by Kabi Energy to De Beers for use of the land

during the operational period will be directed towards CSI spend. The mitigation measures listed in the report to address the potential negative impacts during the construction phase should also be implemented.

The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed Kabi Energy PVSEF is therefore supported by the findings of the SIA.

#### **5.4 IMPACT STATEMENT**

The findings of the SIA indicate that the proposed Kabi Energy PVSEF site is well suited for the establishment of a PVSEF. This due to the sites location on an area used as a mine tailings dump and within close proximity of the City of Kimberley. It is therefore recommended that the facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

## ANNEXURE A

### REFERENCES

#### Key stakeholders contacted<sup>5</sup>

- Molwantwa Selogilwe Senior Town & Regional Planner Francis Baard District Municipality (13/07/2011)
- Basil Louw Local Economic Development (LED) & Tourism Francis Baard District Municipality (13/07/2011)
- Michelle Peters, Environmental Manager De Beers Consolidated Mines Limited - Kimberley Mines (14/07/2011)
- Phil Edmunds, Kabi Energy (Proprietary) Limited (14/07/2011)
- Goolam Akharwaray, Municipal Manager Sol Plaatje Municipality (13/07/2011)
- Tania Anderson, WESSA NC (06/09/2010).

#### Printed sources

- Australian Environment Protection and Heritage Council (EPHC), *National Wind Farm Development Guidelines DRAFT* - July 2010;
- Frances Baard District Municipality Integrated Development Plan (2007-2011);
- MetroGIS (Pty) Ltd. Visual Impact Assessment Proposed Kabi PVSEF (July, 2011).
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Republic of South Africa. The National Energy Act (2008);
- Republic of South Africa (December 1998). *White Paper on Energy Policy*.
- Republic of South Africa (2003). *White Paper on Renewable Energy*.
- Warren, Charles R. and Birnie, Richard V.(2009) 'Re-powering Scotland: Wind Farms and the 'Energy or Environment?' Debate', *Scottish Geographical Journal*, 125: 2, 97 – 126;
- Sol Plaatje Local Municipality Integrated Development Plan (2007-2011);
- The National Energy Act (2008);
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- The White Paper on Renewable Energy (November 2003);

#### Internet sources

- [www.demarcation.org.za](http://www.demarcation.org.za) (Census 2001 data).
- Google Earth 2009.

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<sup>5</sup> A number of the key authorities in the area were interviewed in 2010 as part of the SIA for a proposed CSP located near Upington. For the purpose of the Kabi SIA it is assumed that the generic comments relating to renewable energy, and specifically solar energy, apply.

## ANNEXURE B

### METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, where it will be indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score between 1 and 5 will be assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, where it will be indicated whether:
  - \* the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - \* the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - \* medium-term (5–15 years) – assigned a score of 3;
  - \* long term (> 15 years) - assigned a score of 4; or
  - \* permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - \* 0 is small and will have no effect on the environment;
  - \* 2 is minor and will not result in an impact on processes;
  - \* 4 is low and will cause a slight impact on processes;
  - \* 6 is moderate and will result in processes continuing but in a modified way;
  - \* 8 is high (processes are altered to the extent that they temporarily cease); and
  - \* 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - \* Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - \* Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - \* Assigned a score of 3 is probable (distinct possibility);
  - \* Assigned a score of 4 is highly probable (most likely); and
  - \* Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The *degree* to which the impact can be *reversed*.
- The *degree* to which the impact may cause *irreplaceable loss of resources*.
- The *degree* to which the impact can be *mitigated*.

The **significance** is determined by combining the criteria in the following formula:

$S=(E+D+M)P$ ; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

## ANNEXURE C

### ENVIRONMENTAL MANAGEMENT PLAN: SIA

#### CONSTRUCTION PHASE

#### Creation of employment and business opportunities

**OBJECTIVE: Maximise local employment and business opportunities associated with the construction phase.**

<b>Project component/s</b>	Construction and establishment activities associated with the establishment of the PVSEF , including infrastructure etc.	
<b>Potential Impact</b>	The opportunities and benefits associated with the creation of local employment and business should be maximised.	
<b>Activity/risk source</b>	The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.	
<b>Mitigation: Target/Objective</b>	Kabi Energy, in discussions with its chosen EPC contractor, should aim to employ a minimum of 80% of the low-skilled workers from the local area. This should also be made a requirement for all contractors.	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>Attempt to employ a minimum of 80% of the low-skilled workers are sourced from the local area;</li> <li>Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that 80% target is met.</li> <li>Request that contractors appointed investigate option of employing local companies that meet required BEE requirements. Identify potential opportunities for local businesses</li> </ul>	<ul style="list-style-type: none"> <li>Kabi Energy &amp; EPC contractor</li> <li>EPC contractor</li> <li>Kabi Energy</li> </ul>	<ul style="list-style-type: none"> <li>Employment and business policy document that sets out local employment targets to be in place before construction phase commences.</li> <li>Where required, training and skills development programmes to be initiated prior to the initiation of the construction phase.</li> <li>Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase commences.</li> </ul>
<b>Performance</b>	<ul style="list-style-type: none"> <li>Employment and business policy document that sets out local</li> </ul>	

Indicator	<p>employment and targets completed before construction phase commences;</p> <ul style="list-style-type: none"> <li>• 80% of semi and unskilled labour locally sourced.</li> <li>• Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase.</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Kabi Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

## Impact associated with presence of construction workers

**OBJECTIVE: Avoid the potential impacts on family structures and social networks associated with presence of construction workers from outside the area**

Project component/s	Construction and establishment activities associated with the establishment of the PVSEF , including infrastructure etc.	
Potential Impact	The presence of construction workers who live outside the area and who are housed in local towns can affect family structures and social networks.	
Activity/risk source	The presence of construction workers can impact negatively on family structures and social networks, especially in small, rural communities.	
Mitigation: Target/Objective	To avoid and or minimise the potential impact of construction workers on the local community. This can be achieved by maximising the number of locals employed during the construction phase and minimising the number of workers housed on the site.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> <li>• Attempt to ensure that a minimum of 80% of the low-skilled workers are sourced from the local area.</li> <li>• Identify local contractors who are qualified to undertake the required work.</li> <li>• Develop a Code of Conduct to cover the activities of the construction workers housed on the site.</li> <li>• Ensure that construction workers attend a brief session before they commence activities. The aim of the briefing session is to inform them of the rules and regulations governing activities on the site as set</li> </ul>	<ul style="list-style-type: none"> <li>• Kabi Energy and contractors</li> <li>• Kabi Energy</li> <li>• Kabi Energy</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Identify suitable local contractors prior to the tender process for the construction phase.</li> <li>• Code of Conduct drafted before construction phase commences.</li> <li>• Briefing session for construction workers held before they commence work on site.</li> </ul>

<p>out in the Code of Conduct.</p> <ul style="list-style-type: none"> <li>• Ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.</li> <li>• Ensure that construction workers who are found guilty of breaching the Code of Conduct are dismissed. All dismissals must be in accordance with South African labour legislation.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractors</li> <li>• Contactors</li> </ul>	
<p>Performance Indicator</p>	<ul style="list-style-type: none"> <li>• Employment policy and tender documents that sets out local employment and targets completed before construction phase commences;</li> <li>• 80% of semi and unskilled labour locally sourced;</li> <li>• Tender documents for contractors include recommendations for construction camp;</li> <li>• MF set up prior to implementation of construction phase;</li> <li>• Code of Conduct drafted before commencement of construction phase;</li> <li>• Briefing session with construction workers held at outset of construction phase;</li> </ul>	
<p>Monitoring</p>	<ul style="list-style-type: none"> <li>• Kabi Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>	

## Safety, poaching, stock theft and damage to farm infrastructure

**OBJECTIVE: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities and the potential loss of stock and damage to farm infrastructure.**

<b>Project component/s</b>	Construction and establishment activities associated with the establishment of the PVSEF , including infrastructure etc.	
<b>Potential Impact</b>	Impact on safety of farmers and communities (increased crime etc) and potential loss of livestock due to stock theft by construction workers and also damage to farm infrastructure, such as gates and fences.	
<b>Activity/risk source</b>	The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may also result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.	
<b>Mitigation: Target/Objective</b>	To avoid and or minimise the potential impact on local communities and their livelihoods.	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>• The housing of construction workers on the site should be limited to security personnel.</li> <li>• Develop a Code of Conduct for construction workers.</li> <li>• Inform all workers of the conditions contained in the Code of Conduct.</li> <li>• Dismiss all workers that do not adhere to the code of conduct for workers. All dismissals must be in accordance with South African labour legislation.</li> </ul>	<ul style="list-style-type: none"> <li>• Kabi Energy and contractors</li> <li>• Kabi Energy</li> <li>• Kabi Energy and Contractor</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Develop Code of Conduct prior to commencement of construction phase. The Code of Conduct should be signed by Kabi Energy and the contractors before the contractors move onto site;</li> <li>• Inform all construction workers of Code of Conduct requirements before construction phase commences.</li> </ul>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>• Code of Conduct developed and approved prior to commencement of construction phase.</li> <li>• All construction workers made aware of Code of Conduct within first week of being employed.</li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Kabi Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>	

## Increase risk of grass fires

**OBJECTIVE: To avoid and or minimise the potential risk of increased veld fires during the construction phase.**

<b>Project component/s</b>	Construction and establishment activities associated with the establishment of PVSEF , including infrastructure etc.	
<b>Potential Impact</b>	Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences.	
<b>Activity/risk source</b>	The presence of construction workers and their activities on the site can increase the risk of veld fires.	
<b>Mitigation: Target/Objective</b>	To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>• Ensure that open fires on the site for cooking or heating are not allowed except in designated areas.</li> <li>• Provide adequate fire fighting equipment onsite.</li> <li>• Provide fire-fighting training to selected construction staff.</li> <li>• Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Kabi Energy and contractors</li> <li>• Kabi Energy and contractors</li> <li>• Contractors</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that these conditions are included in the Construction Phase EMP.</li> <li>• Ensure that designated areas for fires are identified on site at the outset of the construction phase.</li> <li>• Ensure that fire fighting equipment and training is provided before the construction phase commences.</li> <li>• Compensate Farmers within 1 month of claim being verified Kabi Energy and Contractors</li> </ul>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>• Conditions contained in the Construction EMP.</li> <li>• Designated areas for fires identified on site at the outset of the construction phase.</li> <li>• Fire fighting equipment and training provided before the construction phase commences.</li> <li>• Compensation claims settled within 1 month of claim being verified by Contractors and Kabi Energy.</li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Kabi Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>	

## Impact of dust and noise due to heavy vehicles and damage to roads

**OBJECTIVE: To avoid and or minimise the potential impacts of safety, noise and dust and damage to roads caused by construction vehicles during the construction phase.**

<b>Project component/s</b>	Construction and establishment activities associated with the establishment of the PVSEF , including infrastructure etc.	
<b>Potential Impact</b>	Heavy vehicles can generate noise and dust impacts. Movement of heavy vehicles can also damage roads.	
<b>Activity/risk source</b>	The movement of heavy vehicles and their activities on the site can result in noise and dust impacts and damage roads.	
<b>Mitigation: Target/Objective</b>	To avoid and or minimise the potential noise and dust impacts associated with heavy vehicles, and minimise damage to roads.	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>• Implement dust suppression measures for heavy vehicles such as wetting roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.</li> <li>• Ensure that all vehicles are road-worthy, drivers are qualified and are made aware of the potential noise, dust and safety issues.</li> <li>• Ensure that drivers adhere to speed limits. Vehicles should be fitted with recorders to record when vehicles exceed the speed limit.</li> <li>• Ensure that damage to roads is repaired before completion of construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractors</li> <li>• Contractors</li> <li>• Contractors</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that these conditions are included in the Construction Phase EMP.</li> <li>• Ensure that dust suppression measures are implemented for all heavy vehicles that require such measures during the construction phase commences.</li> <li>• Ensure that drivers are made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>• Fit all heavy vehicles with speed monitors before they are used in the construction phase.</li> <li>• Assess road worthy status of heavy vehicles at the outset of the construction phase and on a monthly basis thereafter;</li> <li>• Ensure that damage to roads is repaired before completion of construction phase.</li> </ul>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>• Conditions included in the Construction Phase EMP.</li> <li>• Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences.</li> <li>• Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> <li>• All heavy vehicles equipped with speed monitors before they</li> </ul>	

	<p>are used in the construction phase.</p> <ul style="list-style-type: none"> <li>• Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Kabi Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

## OPERATIONAL PHASE

### Creation of employment and business opportunities

**OBJECTIVE: Maximise local employment and business opportunities associated with the operational phase.**

<b>Project component/s</b>	Day to day operational activities associated with the PVSEF , including maintenance etc.	
<b>Potential Impact</b>	The opportunities and benefits associated with the creation of local employment and business should be maximised	
<b>Activity/risk source</b>	The operational phase of the PV facility will create approximately 54 full time employment opportunities.	
<b>Mitigation: Target/Objective</b>	In the medium to long term employ as many locals as possible to fill the 54 full time employment opportunities.	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>The entire workforce of 54 permanent staff will be based in Kimberley.</li> <li>Identify local members of the community who are suitably qualified or who have the potential to be employed full time.</li> </ul>	<ul style="list-style-type: none"> <li>Kabi Energy</li> <li>Kabi Energy</li> </ul>	<ul style="list-style-type: none"> <li>Identify local members of the community who are suitably qualified or who have the potential to be employed full time during the construction phase.</li> </ul>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>Potential locals identified before construction phase completed.</li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Kabi Energy must monitor indicators listed above to ensure that they have been met for the operational phase.</li> </ul>	

## Impact on tourism and highlight benefits of renewable energy projects

**OBJECTIVE:** Maximise the potential tourism opportunities during the operational phase. In addition, highlight the benefits of renewable energy projects.

<b>Project component/s</b>	Operational phase of the project.	
<b>Potential Impact</b>	The proposed PVSEF has the potential to provide SPLM with an attraction that would improve its attraction to tourists. The development also has the potential to promote the benefits of renewable energy projects.	
<b>Activity/risk source</b>	The establishment of a PVSEF has the potential to create and attraction for visitors to the area. The development also has the potential to promote the benefits of renewable energy projects.	
<b>Mitigation: Target/Objective</b>	To enhance the potential tourism and renewable energy opportunities associated with the proposed PVSEF .	
<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
<ul style="list-style-type: none"> <li>• Liaise with representatives from the SPLM and tourism organizations to raise awareness of the proposed PVSEF ;</li> <li>• Establish a renewable energy interpretation centre at the site. The centre should be equipped with information boards that provide visitors with information on the project and other relevant information. Information should also be provided on renewable energy and its benefits.</li> </ul>	<ul style="list-style-type: none"> <li>• Kabi Energy</li> <li>• Kabi Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Set up meeting with SPLM and local tourism organisations during the construction phase.</li> <li>• Establish interpretation centre at the outset of the construction phase. This will create an opportunity to provide tourists with information on both the construction and operational phases of the project.</li> </ul>
<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>• Meeting with SPLM and local tourism organisations during the construction phase.</li> <li>• Establishment of interpretation centre at the outset of the construction phase.</li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Kabi Energy must monitor indicators listed above to ensure that they have been met for the operational phase.</li> </ul>	

## DECOMMISSIONING PHASE

### Impact of decommissioning

**OBJECTIVE: To avoid and or minimise the potential impacts associated with the decommissioning phase.**

Project component/s	Decommissioning phase of the PVSEF		
Potential Impact	Decommissioning will result in job losses, which in turn can result in a number of social impacts, such as reduced quality of life, stress, depression etc. However, the number of people affected (54) is relatively small. Decommissioning is also similar to the construction phase in that it will also create temporary employment opportunities.		
Activity/risk source	Decommissioning of the PVSEF		
Mitigation: Target/Objective	To avoid and or minimise the potential social impacts associated with decommissioning phase of the PVSEF .		
Mitigation: Action/control	Responsibility	Timeframe	
<ul style="list-style-type: none"> <li>Retrenchments should comply with South African Labour legislation of the day</li> </ul>	<ul style="list-style-type: none"> <li>Kabi Energy</li> </ul>	<ul style="list-style-type: none"> <li>When PVSEF is decommissioned</li> </ul>	
Performance Indicator	<ul style="list-style-type: none"> <li>South African Labour legislation relevant at the time</li> </ul>		
Monitoring	<ul style="list-style-type: none"> <li>Kabi Energy and Department of Labour</li> </ul>		