

**SOCIAL IMPACT ASSESSMENT
FOR
PROPOSED SAN PHOTOVOLTAIC ENERGY
FACILITY
NORTHERN CAPE PROVINCE**

(DRAFT REPORT)

SEPTEMBER 2012

Prepared for

SAVANNAH ENVIRONMENTAL (Pty) Ltd

By

Tony Barbour

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

P O Box 1753, Sun Valley, 7975, South Africa
(Tel) 27-21-789 1112 - (Fax) 27-21-789 1112 - (Cell) 082 600 8266
(E-Mail) tbarbour@telkomsa.net

EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental Consulting (Pty) Ltd was appointed by San Solar Energy Facility (Pty) Ltd (hereafter referred to as SSE) as the lead consultant to manage the Environmental Impact Assessment (EIA) process for the establishment of the proposed San photovoltaic solar energy facility (PVSEF) and associated infrastructure on the remaining extent of Farm Wincanton 472, which is located in the Gamagara Local Municipality (GLM), approximately 5 km north east and 16 km north west of the town of Dibeng and Kathu respectively in the Northern Cape Province, South Africa (Figure 1.1).

DESCRIPTION OF THE PROPOSED PVSEF

The proposed San PVSEF has a generation capacity of 75 MW. The energy from the PVSEF will be linked via a 132 kV power line to the Eskom grid. The project is therefore an Independent Power Producer (IPP) project.

Solar energy facilities, such as those using PVSEF 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 Photovoltaic Cell

A photovoltaic (PV) cell is made of silicone 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 photovoltaic 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 PVSEF panels will be fixed to a support structure and will track the movement of the sun so as to receive the maximum amount of solar radiation. The PVSEF panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

- PV solar panels with a generating capacity of ~ 75 MW;
- An on-site inverter to step up the power and a small substation to facilitate the connection between the solar energy facility and the Eskom electricity grid;
- Underground cabling in order to distribute the power to an on-site substation;
- A 132 kV power line linking the on-site substation to Eskom grid;
- Foundations to support the PV panels;
- Laydown areas and internal access roads;
- Workshop area for maintenance and storage.

Based on the information from other PVSEF projects the construction phase is expected to extend over a period of 12-18 months and create approximately 291 employment opportunities. The operational phase will employ approximately 60 people full time for a

period of up to 20 years. The capital expenditure associated with the construction phase will be in the region of R 1.35 billion for a 75 MW facility.

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). These guidelines are based on international best practice. 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 Social Impact Assessment 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; and
- 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; and
- 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 BA 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.

Fit with planning

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)

- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework, Vol. 2 (2011); and
- John Taolo Gaetsewe District Municipality Reviewed Integrated Development Plan (2007-2011)

The findings of the review indicated that solar energy was strongly supported at a national and 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 energy generation in South Africa to renewables.

Based on this it is reasonable to assume that the establishment of PVSEFs is supported. The NCPGDS and JTGDM IDP also emphasise the importance of SMME development and the provision of economic infrastructure, which would include energy related infrastructure. However, the NCPGDS also states 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 Province's 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.

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.

The construction phase is expected to extend over a period of 18-24 months and create approximately 291 employment opportunities. Of this total ~ 68% (198) will be available to low-skilled workers (construction labourers, security staff etc.) and semi-skilled workers (drivers, equipment operators etc.) and 32% (93) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of low-skilled employment opportunities associated with the project are likely to benefit members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. The low education and skills levels in the area may however hamper potential opportunities for local communities. The majority of the skilled and semi-skilled opportunities are likely to be associated with the contactors appointed to construct the proposed PVSEF and the 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. 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.

The total wage bill for the 18-24 month construction phase will be in the region of R 60 million. The injection of income into the area in the form of wages and rental for accommodation will create opportunities for local businesses in Kathu. 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, etc. associated with the construction phase. The benefits to the local economy will be confined to the construction period (18-24 months).

The capital expenditure is anticipated to be in the region of R 1.35 billion for a 75 MW facility. However, given the technical nature of the project and high import content associated with PVSEF the potential opportunities for the GLM economy will be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kathu. Implementing the enhancement measures listed below can enhance these opportunities.

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 majority of potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. However, the impact on individuals who are directly impacted on by construction workers and or job seekers (i.e. contract HIV/ AIDS) was assessed to be of Medium-High negative significance. At a community level the potential risk posed by construction workers and or job seekers was found to be low. This was due to the relatively small size of the construction force (291) and the likelihood that 200-220 could be sourced locally. The potential risk to local family structures and social networks is therefore likely to be low. Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	Medium (Positive impact)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Risk of stock theft, poaching and damage to farm infrastructure	Medium (Negative impact)	Low (Negative impact)
Risk of veld fires	Medium (Negative impact)	Low (Negative impact)
Impact of heavy vehicles and construction activities	Low (Negative impact)	Low (Negative impact)
Loss of farmland	High (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;
- Benefits associated with the establishment of a community trust.
- The establishment of infrastructure to generate renewable energy.

The total number of permanent employment opportunities is estimated to be in the region of 60. Of this total ~ 30 (50%) will be low skilled (security and maintenance), 10 (17%) semi-skilled and 20 (33%) skilled employees. The majority of the beneficiaries are therefore likely to be historically disadvantaged (HD) members of the community from Kathu and Dibeng. Over time it will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Northern Cape Provincial Growth and Development Strategy (NCPGDS) and John Taolo Gaetsewe District Municipality (JTGDM) IDP.

The establishment of a Community Trust also creates an opportunity to support local economic development in the area. San Solar Energy has indicated that they are committed to establishment of a Trust. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20 year period. The revenue from the proposed PVSEF plant can be used to support a number of social and economic initiatives in the area, including:

- Creation of jobs;
- Education;
- Support for and provision of basic services;

- School feeding schemes;
- Training and skills development;
- Support for SMME's.

The long term duration of the revenue stream associated with a PVSEF linked Community Trust also enables local municipalities and communities to undertake long term planning for the area. Experience has however also shown that Community Trusts can be mismanaged. This issue will need to be addressed in order to maximise the potential benefits associated with the establishment of a Community Trust. In this regard San Solar Energy should investigate linking the project with the existing Gamagara Development Trust. The benefit of this option would be linking up with an existing and established structure. This would also assist to address the potential concerns regarding mismanagement of funds etc.

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 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 visual impacts on landscape character associated with large renewable energy facilities, such as solar thermal plants, are highlighted in the research undertaken by Warren and Birnie (2009). In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The impact of solar energy plants on the landscape is therefore likely to be a key issue in South Africa, specifically given South African's strong attachment to the land and the growing number of solar energy applications. The visual impacts associated with the proposed San PVSEF are, however, likely to be low due to its relatively small size (75MW) and its location. In addition, the visual character of the area has been impacted by the existing infrastructure on the site (electrified railway line and power lines) and mine dumps. The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	Medium (Positive impact)
Benefits associated with the establishment of a community trust	Medium (Positive impact)	High (Positive impact)
Establishment of infrastructure for the generation of renewable energy	Medium (Positive impact)	Medium (Positive impact)
Visual impact and impact on sense of place	Low (Negative impact)	Low (Negative impact)
Impact on tourism	Low (Positive and Negative)	Low (Positive and Negative)

Cumulative Impacts

The cumulative impacts associated with solar energy facilities, such as the proposed San PVSEF, are largely linked to the visual impacts and the associated impact on the areas sense of place. In the case of the proposed San PVSEF, two other PVSEF's are proposed on the farm Wincanton 472. Renewable Energy Investments South Africa (REISA) is proposing a PVSEF on Portion 4 of the farm Wincanton 472. This project is referred to as the Kathu Solar Energy Facility and has a capacity of ~ 100 MW. VentuSA Energy is proposing a PVSEF on Portion 6 of the farm Wincanton 472. This project is referred to as the Sishen Solar Energy Facility and also has a capacity of 100 MW. The two proposed PVSEFs are located immediately to the west and south west of the SAN PVSEF.

Based on the findings of the site visit the potential cumulative impacts are likely to be low. This is due to the fact that all three PVSEFs are located on Wincanton Farm 472. The impacts are therefore concentrated on one site as opposed to being spread over a number of sites. The overall effect is therefore the establishment of a single, large PVSEF as opposed to three separate facilities. The potential cumulative impacts on the areas sense of place is also mitigated by the existing infrastructure on the site and the mine related overburden and the mine dumps in the area. The visual integrity of the area has therefore been altered.

However, it is recommended that the environmental authorities consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of solar thermal plants in the area. In addition, the siting and number of individual components of the plant should be informed by findings of the relevant VIAs, specifically with respect to the visual impact on farmsteads and important roads in the area.

Transmission lines

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

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 negative social cost.

The No-Development option would also result in a loss in employment opportunities associated with both the construction and operational phase. In addition, the benefits associated with the establishment of a Community Trust funded by revenue generated from the sale of energy from the PVSEF would be forfeited. The revenue from the proposed PVSEF plant can be used to support a number of social and economic initiatives in the area. These benefits would be forgone if the proposed San PVSEF is not developed. Given the limited economic opportunities in the area this would represent a negative social cost for the local community.

Decommissioning phase

Due to the relatively small number of people affected (~60) the social impacts associated with the decommissioning of the facility are likely to be low. In addition, the potential impacts can be effectively managed with the implementation of a retrenchment

and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

San Solar Energy should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

RECOMMENDATIONS

The findings of the SIA indicate that the development of the proposed San PVSEF plant will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust funded by revenue generated from the sale of energy from the proposed PVSEF also creates an opportunity to support local economic development in the area. This represents a significant social benefit for an area where there are limited opportunities.

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 San PVSEF is therefore supported by the findings of the SIA.

IMPACT STATEMENT

The findings of the SIA undertaken for the proposed San PVSEF indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust also creates an opportunity to support local economic development in the area. 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.

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.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
SECTION 1: INTRODUCTION.....	1
1.1 INTRODUCTION	1
1.2 TERMS OF REFERENCE.....	2
1.3 PROJECT LOCATION	2
1.4 PROJECT DESCRIPTION.....	3
1.5 APPROACH TO STUDY	5
1.5.1 Definition of social impacts	6
1.5.2 Timing of social impacts	7
1.6 ASSUMPTIONS AND LIMITATIONS	7
1.6.1 Assumptions.....	7
1.6.2 Limitations	8
1.7 SPECIALIST DETAILS.....	8
1.8 DECLARATION OF INDEPENDENCE.....	8
1.9 REPORT STRUCTURE	8
SECTION 2: POLICY AND PLANNING ENVIRONMENT.....	9
2.1 INTRODUCTION	9
2.2 NATIONAL LEVEL ENERGY POLICY	9
2.2.1 National Energy Act (Act No 34 of 2008).....	9
2.2.2 White Paper on the Energy Policy of the Republic of South Africa.....	9
2.2.3 White Paper on Renewable Energy	10
2.2.4 National Integrated Resource Plan for Electricity (2010-2030).....	11
2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING	13
2.3.1 Northern Cape Province Provincial Growth and Development Strategy	13
2.3.2 Northern Cape Climate Change Response Strategy (in progress)	15
2.3.3 Northern Cape Provincial Spatial Development Framework (2011)	15
2.4 DISTRICT LEVEL PLANNING CONTEXT	16
2.4.1 John Taolo Gaetsewe District Municipality Integrated Development Plan 2007-2011	16
SECTION 3: OVERVIEW OF STUDY AREA	18
3.1 INTRODUCTION	18
3.2 PROVINCIAL CONTEXT	18
3.3 SOCIO-ECONOMIC OVERVIEW OF THE PROPOSED PROJECT AREA	22
3.3.1 Introduction	22
3.3.2 Demographic overview	22
3.3.3 Economic overview	24
3.4 SURROUNDING LAND USES	25
SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES	30
4.1 INTRODUCTION	30
4.2 IDENTIFICATION OF KEY SOCIAL ISSUES	30
4.3 POLICY AND PLANNING ISSUES	30
4.4 SOCIAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE.....	31
4.4.1 Creation of employment and business opportunities	31
4.4.2 Presence of construction workers in the area	34
4.4.3 Increased risk of stock theft, poaching and damage to farm infrastructure 36	
4.4.4 Increased risk of veld fires.....	38
4.4.5 Impact of construction vehicles	40
4.4.6 Damage to and loss of farmland	41
4.5 SOCIAL IMPACTS ASSOCIATED WITH THE OPERATIONAL PHASE	42

4.5.1	Creation of employment and business opportunities	42
4.5.2	Benefits associated with the establishment of a community trust.....	44
4.5.3	Development of clean, renewable energy infrastructure	45
4.5.4	Visual impact and impact on sense of place.....	47
4.5.5	Impact on tourism	47
4.6	ASSESSMENT POWER LINE OPTIONS	49
4.7	ASSESSMENT OF NO-DEVELOPMENT OPTION	49
4.8	ASSESSMENT OF CUMULATIVE IMPACTS	51
4.9	ASSESSMENT OF DECOMMISSIONING PHASE	53
	SECTION 5: KEY FINDINGS AND RECOMMENDATIONS	54
5.1	INTRODUCTION	54
5.2	SUMMARY OF KEY FINDINGS	54
5.2.1	Policy and planning issues	54
5.2.2	Construction phase.....	55
5.2.3	Operational phase	57
5.2.4	Assessment of cumulative impacts.....	58
5.2.5	Transmission line options	59
5.2.6	Assessment of no-development option.....	59
5.2.7	Decommissioning phase	59
5.3	CONCLUSIONS AND RECOMMENDATIONS.....	59
5.4	IMPACT STATEMENT	60
	ANNEXURE A	61
	ANNEXURE B	62
	ANNEXURE C	64

ACRONYMS

CSP	Concentrated Solar Power
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
DM	District Municipality
DoE	Department of Energy
EIA	Environmental Impact Assessment
FSPGDS	Free State Provincial Growth and Development Strategy
GDPR	Gross Domestic Product of the Region
HDI	Human Development Index
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
JTGDM	John Taolo Gaetsewe District Municipality
GLM	Gamagara Local Municipality
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
MW	Megawatt
NCPGDS	Northern Cape Provincial Growth and Development Strategy
PV	Photovoltaic
PVSEF	Photovoltaic solar energy facility
SDF	Spatial Development Framework
SIA	Social Impact Assessment
UNFCCC	United Nations Framework Convention on Climate Change

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental Consulting (Pty) Ltd was appointed by San Solar Energy Facility (Pty) Ltd (hereafter referred to as SSE) as the lead consultant to manage the Environmental Impact Assessment (EIA) process for the establishment of the proposed San photovoltaic solar energy facility (PVSEF) and associated infrastructure on the remaining extent of Farm Wincanton 472, which is located in the Gamagara Local Municipality (GLM), approximately 5 km north east and 16 km north west of the town of Dibeng and Kathu respectively in the Northern Cape Province, South Africa (Figure 1.1).

Tony Barbour was appointed by Savannah to undertake a specialist Social Impact Assessment (SIA) as part of the EIA process. This report contains the findings of the SIA undertaken as part of the EIA process.

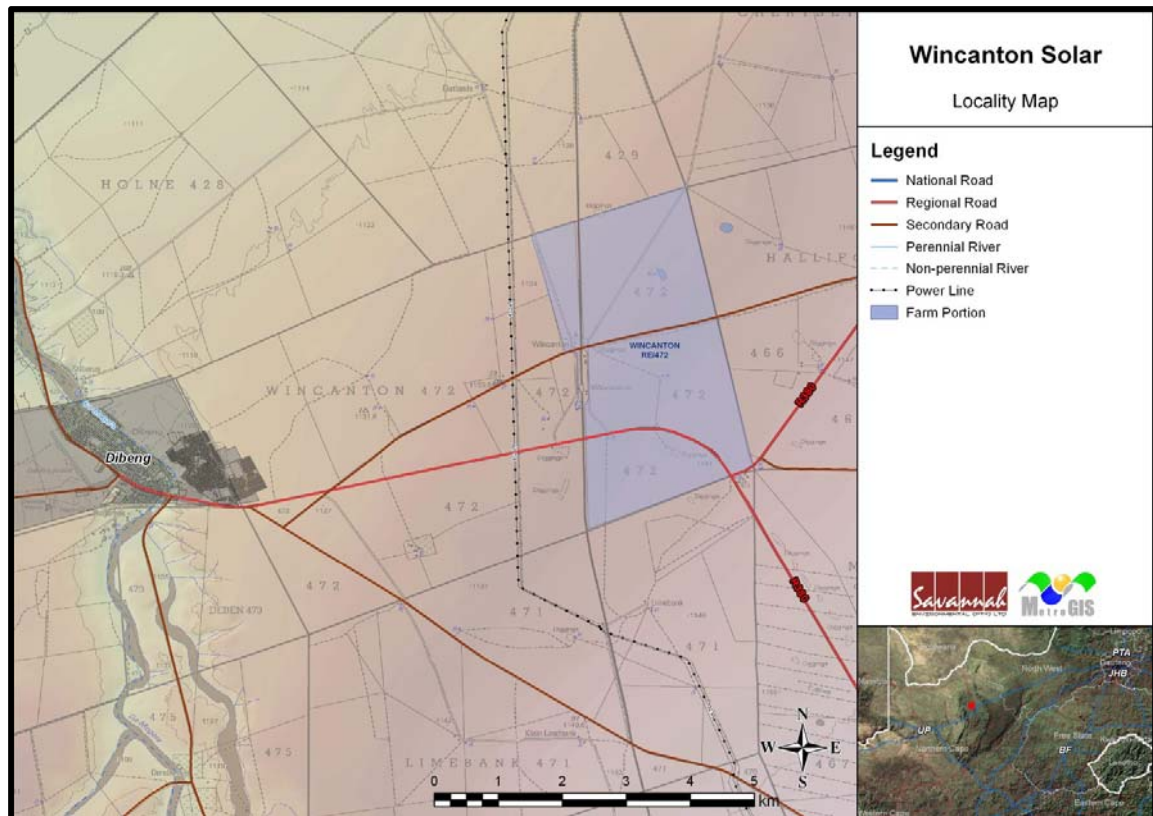


Figure 1.1: Location of San PVSEF

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 maximising opportunities and avoiding and or reducing negative impacts

1.3 PROJECT LOCATION

The proposed San PVSEF site is within the GLM, which forms part of the larger John Taolo Gaetsewe District Municipality (JTGDM) (Figure 1.2). The PVSEF site is located in a rural/agricultural area of the north eastern part of the Northern Cape Province, approximately 16km north west of the mining town of Kathu and 220 km north east of the town of Upington.

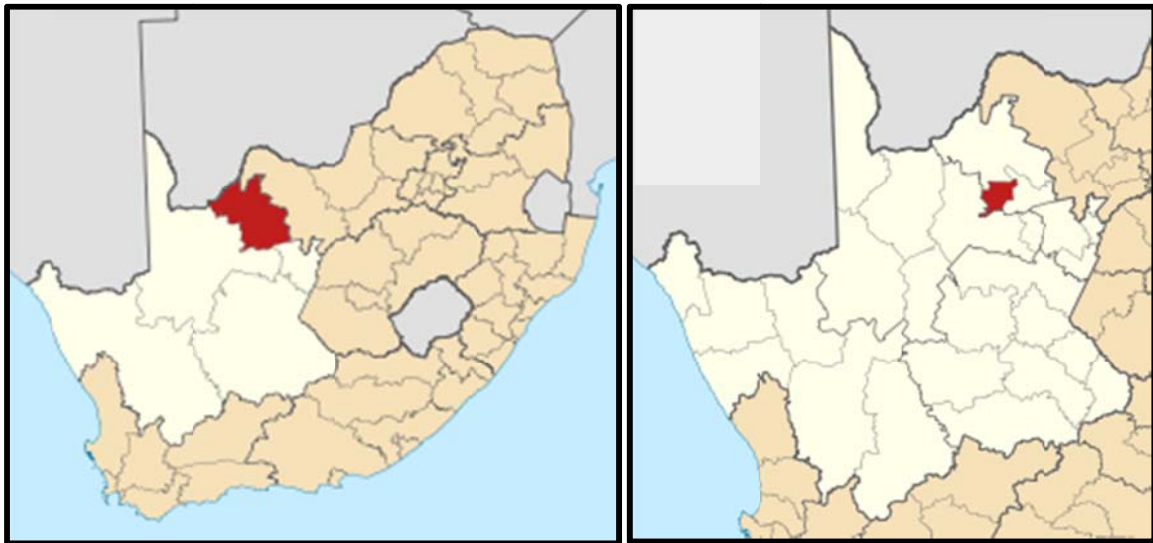


Figure 1.2: The location of John Taolo Gaetsewe District Municipality (left) and Gamagara Local Municipality (right) within the Northern Cape Province (cream)
Source: Wikipedia

1.4 PROJECT DESCRIPTION

The proposed San PVSEF will have a generation capacity of 75 MW. The project will have an expected minimum lifespan of 20 years. The energy will be linked via an on-site substation to the Eskom grid. The project is therefore an Independent Power Producer (IPP) project.

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. A typical photovoltaic (illustrated in Photograph 1.1) consists of the following components:

Photovoltaic Cells

Silicon wafers which are the building blocks, act as semiconductors and when struck by light produce electricity. Individual photovoltaic cells are linked in circuit and placed behind a protective transparent cover sheet to collectively form a photovoltaic panel/array. Photovoltaic cells are highly sensitive to shading, and the output of an entire circuit can be significantly decreased when even a small portion of a cell, panel, or array is shaded, while the remainder is in sunlight. Dust or dirt can also affect the efficiency, therefore, requiring maintenance, the regularity of which depends on the characteristics of the site (i.e. predominant wind direction and dusty conditions).

The support structure

The photovoltaic panels are fixed to support structures which are either bolted directly into the ground or fixed by means of concrete foundations. These structures can be adjusted in terms of their angle relative to the sun. Depending on the latitude of the proposed facility, the angle of the support structures may be adjusted to optimise for summer / winter solar radiation characteristics.

Inverter

The photovoltaic effect produces electricity in direct current. However, in order to transmit this power within the Eskom grid it must be converted to alternating current which requires an inverter. When the photovoltaic panels are connected as separate strings, each string can be allocated its own inverter thereby ensuring the continued operation of the facility should one or more strings be compromised or require maintenance.



Source: www.wapa.gov

Photograph 1.1: Photovoltaic array

The basic infrastructure associated with the proposed San PVSEF would include:

- PV solar panels with a generating capacity of ~ 75 MW;
- An on-site inverter to step up the power and a small substation to facilitate the connection between the solar energy facility and the Eskom electricity grid;
- Underground cabling in order to distribute the power to an on-site substation;
- A 132 kV power line linking the on-site substation to Eskom grid;
- Foundations to support the PV panels;
- Laydown areas and internal access roads;
- Workshop area for maintenance and storage.

The layout of the proposed San PVSEF is illustrated in Figure 1.3. Based on the information from other PVSEF projects the construction phase is expected to extend over a period of 12-18 months and create approximately 291 employment opportunities. The operational phase will employ approximately 60 people full time for a period of up to 20 years. The capital expenditure associated with the construction phase will be in the region of R 1.35 billion for a 75 MW facility.

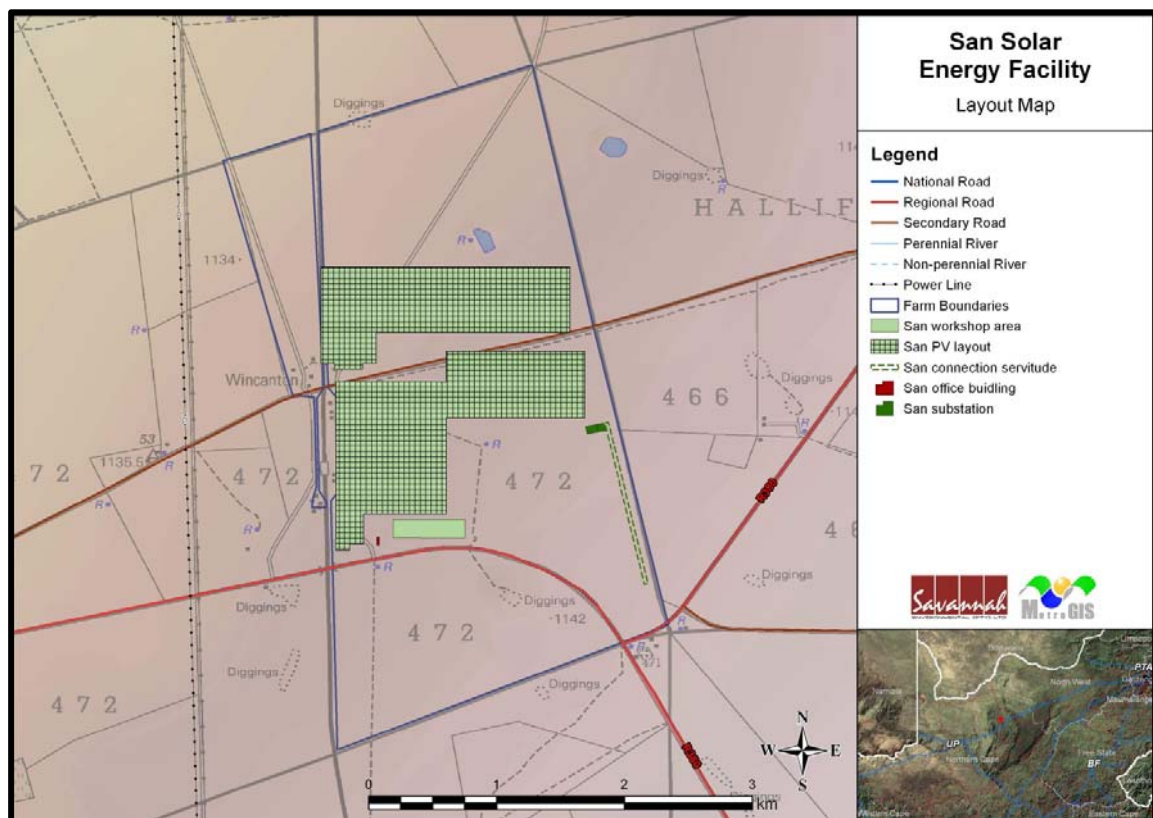


Figure 1.3: Layout of San PVSEF

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). These guidelines are based on international best practice. 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 proposed San PVSEF site identified by SSE represents a technically suitable site for the establishment of a PVSEF plant.

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 other parts of South Africa, specifically the Northern Cape Province, have been interviewed as part of the SIAs for other solar energy projects. For the purpose of the San SIA it is assumed that the generic issues relating to renewable energy, and specifically solar energy, also apply to the proposed San PVSEF plant.

1.6.2 Limitations

Demographic data

The demographic data used in the study is largely based on the 2001 Census¹. 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. However, for the purposes of this study it was possible to source ward level information from a previous study undertaken in the area.

1.7 SPECIALIST DETAILS

The lead author of this report is an independent specialist with 23 years' 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 120 SIAs and is the author of the Guidelines for Social Impact Assessments for EIAs adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. These guidelines are based on international best practice and have been used widely in South Africa. Tony Barbour has also undertaken specialist SIA studies for over 20 PVSEFs in South Africa.

1.8 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the Draft SIA Report, is independent and does not have vested or financial interests in the proposed San PVSEF being either approved or rejected.

1.9 REPORT STRUCTURE

The report is divided into five sections, namely:

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

¹ 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.

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Section 2 provides an overview of the policy and planning environment affecting the proposed PVSEF. For the purposes of the meeting the objectives of the SIA 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);
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework, Vol. 2 (2011); and
- John Taolo Gaetsewe District Municipality Reviewed Integrated Development Plan (2007-2011)

2.2 NATIONAL LEVEL ENERGY POLICY

2.2.1 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).

2.2.2 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; and
- Generally lower running costs, and high labour intensities.

Disadvantages include:

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

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

2.2.3 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 Protocol²,

² The **Kyoto Protocol** is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[[]The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and

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 Copenhagen 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).

2.2.4 National Integrated Resource Plan for Electricity (2010-2030)

The current iteration of the Integrated Resource Plan (IRP) for South Africa, initiated by the Department of Energy (DoE) after a first round of public participation in June 2010, led to the Revised Balanced Scenario (RBS) that was published in October 2010. The document outlines the proposed generation new build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on the cost-optimal solution for new build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. In addition to all existing and committed power plants, the RBS included a nuclear fleet of 9,6 GW; 6,3 GW of coal; 11,4 GW of renewables; and 11,0 GW of other generation sources.

A second round of public participation was conducted in November/December 2010, which led to several changes to the IRP model assumptions. The main changes were the disaggregation of renewable energy technologies to explicitly display solar photovoltaic (PV), concentrated solar power (CSP) and wind options; the inclusion of learning rates, which mainly affected renewables; and the adjustment of investment costs for nuclear units, which until then represented the costs of a traditional technology reactor and were too low for a newer technology reactor (a possible increase of 40%).

entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia)

Additional cost-optimal scenarios were generated based on the changes. The outcomes of these scenarios, in conjunction with the following policy considerations, led to the Policy-Adjusted IRP:

- The installation of renewables (solar PV, CSP and wind) were brought forward in order to accelerate a local industry;
- To account for the uncertainties associated with the costs of renewables and fuels, a nuclear fleet of 9,6 GW was included in the IRP;
- The emission constraint of the RBS (275 million tons of carbon dioxide per year after 2024) was maintained; and
- Energy efficiency demand-side management (EEDSM) measures were maintained at the level of the RBS.

Table 2.1 National Energy Development Commitments before the next IRP

	New build options							
	Coal (PF, FBC, imports, own build)	Nuclear	Import hydro	Gas – CCGT	Peak – OCGT	Wind	CSP	SolarPV
	MW	MW	MW	MW	MW	MW	MW	MW
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	300
2013	0	0	0	0	0	0	0	300
2014	500 ¹	0	0	0	0	400	0	300
2015	500 ¹	0	0	0	0	400	0	300
2016	0	0	0	0	0	400	100	300
2017	0	0	0	0	0	400	100	300
2018	0	0	0	0	0	400 ⁴	100 ⁴	300 ⁴
2019	250	0	0	237 ²	0	400 ⁴	100 ⁴	300 ⁴
2020	250	0	0	237 ²	0	400	100	300
2021	250	0	0	237 ²	0	400	100	300
2022	250	0	1 143 ²	0	805	400	100	300
2023	250	1 600	1 183 ²	0	805	400	100	300
2024	250	1 600	283 ²	0	0	800	100	300
2025	250	1 600	0	0	805	1 600	100	1 000
2026	1 000	1 600	0	0	0	400	0	500
2027	250	0	0	0	0	1 600	0	500
2028	1 000	1 600	0	474	690	0	0	500
2029	250	1 600	0	237	805	0	0	1 000
2030	1 000	0	0	948	0	0	0	1 000
Total	6 250	9 600	2 609	2 370	3 910	8 400	1 000	8 400

Firm commitment necessary now
 Final commitment in IRP 2012

1. Built, owned & operated by IPPs 2. Commitment necessary due to required high-voltage infrastructure, which has long lead time 3. Commitment necessary due to required gas infrastructure, which has long lead time 4. Possibly required grid upgrade has long lead time and thus makes commitment to power capacity necessary

Source: Integrated Resource Plan (IRP) for South Africa (2010)

Table 2.1 above indicates the new capacities of the Policy commitment. The dates shown in Table 2.1 indicate the latest that the capacity is required in order to avoid security of supply concerns. The document notes that projects could be concluded earlier than indicated.

The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources. The Policy-Adjusted IRP has therefore resulted in an increase in the contribution from renewables from 11,4 GW to 17,8 GW.

The key recommendations contained in the Policy-Adjusted IRP Final Report (March 2011) that have a bearing on the renewable energy sector include:

General

- The dark shaded projects in Table 2.1 need to be decided before the next IRP iteration, with the identified capacities thereafter assumed as “committed” projects;
- The light shaded options should be confirmed in the next IRP iteration; and
- All non-shaded options could be replaced during the next, and subsequent, IRP iterations if IRP assumptions change and thus impact on the quantitative model results.

PV Solar energy

- Solar PV programme 2012-2015: In order to facilitate the connection of the first solar PV units to the grid in 2012 a firm commitment to this capacity is necessary. Furthermore, to provide the security of investment to ramp up a sustainable local industry cluster, the first four years from 2012 to 2015 require firm commitment; and
- Solar PV 2016 to 2019: Grid upgrades might become necessary for the second round of solar PV installations from 2016 to 2019, depending on their location. To trigger the associated tasks in a timely manner, a firm commitment to these capacities is necessary in the next round of the IRP at the latest. By then, the assumed cost decreases for solar PV will be confirmed.

Conclusions

The key conclusions that are relevant to the renewable energy sector include:

- An accelerated roll-out of renewable energy options should be allowed in order to derive the benefits of localisation in these technologies; and
- A solar PV programme as envisaged in the Policy-Adjusted IRP should be pursued (including decentralised generation).

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Northern Cape Province Provincial Growth and Development Strategy

The Provincial Growth and Development Strategy (PGDS) 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 PGDS 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; and
- Tourism.

However, the PGDS 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; and
- 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:

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

Of specific relevance to the SIA the Northern Cape PGDS refers 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 Northern Cape PGDS 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 Northern Cape PGDS 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 PV facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

Care would need to be taken to ensure that the proposed PV facility and other renewable energy facilities do not negatively impact on the regions natural environment. In this regard the Northern Cape PGDS 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 PV facility; do not affect the tourism potential of the province.

The Northern Cape PGDS also notes that the Northern Cape Provincial Government (NCPG) would promote the preservation of agricultural biodiversity and the sustainable use of soil and water through the application of legislation and related regulations where this is necessary

2.3.2 Northern Cape Climate Change Response Strategy (in progress)

The NCPG appears to be in the process of finalising a Provincial Climate Change Response Strategy (NCPCCRS). In this regard, completion of a Draft document was announced in March 2011, and finalisation of the report was anticipated by the end of 2011. Neither document appears to have been released at the time of preparing the SIA (April 2012).

The key aspects of the Draft PCCRS Report are, however, summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy would be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key Sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC Lucas' address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the Northern Cape Province's (NCP) extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnerships is indented as an important provincial intervention in addressing climate change. The renewable energy sector, including **solar** and wind energy (but also biofuels and energy from waste), is explicitly identified as an important element of the Provincial Climate Change Response Strategy. The MEC further indicated that the NCP was involved in the processing 7 wind energy facilities (WEFs) and 11 solar energy facilities (SEFs) EIA applications (March 2011)³.

2.3.3 Northern Cape Provincial Spatial Development Framework (2011)

Dennis Moss Partnership is currently preparing a Provincial Spatial Development Framework (PDSF) for the NCP. The PDSF is a legal requirement in terms of Chapter 4 of the Northern Cape Planning and Development Act 7 of 1998. Volumes 1 and 2 were finalised in December 2011. Volumes 1 and 2 are essentially introductory, status quo reports. Volume 2 provides a situation analysis of the NCP, mainly with the view of identifying key aspects for policy focus/ intervention. Volumes 3 (Spatial Directives) and 4 (Strategies) are currently in preparation, and no Draft documents are available at this stage.

Volume 2 (Situation Analysis and Key Aspects) indicates that the envisaged Spatial Directives and Strategies reports would be closely aligned to the 2004-2014 Northern Cape Provincial Growth and Development Strategy (PGDS) (currently in Draft 4)⁴. Volume 2 includes an overview of some key relevant aspects of the PGDS Draft 4, including the role of the renewable energy and tourism sectors in the provincial economy.

³ (www.info.gov.za/speech/DynamicAction?pageid=461&sid=22143&tid=45200).

⁴ Draft 4 (2011) of the PGDS does not seem to have been made public yet.

Renewable Energy

The PSDF (Vol. 2) notes that, at present, the Eskom Vanderkloof hydro station on the Orange River (240 MW) represents the only large energy-generating facility in the NCP. Most of the energy used in the province is generated by Eskom plants located elsewhere in South Africa, mainly Mpumalanga Province. The PSDF therefore notes that the NCP's major energy challenges include securing energy supply to meet growing demand, providing everybody with access to energy services and tackling the causes and impacts of climate change (as per PGDS). In this regard, the development of large-scale renewable energy supply schemes is strategically important for increasing the diversity of domestic energy supplies for the NCP, and avoiding energy imports while minimizing the environmental impacts.

The PSDF further notes that renewable energy has been identified in the Draft 4 PGDS (2011) as a mechanism to diversify the economy and thereby promoting a green economy in the province. According to the PGDS, greening the economy is characterized by substantially increased investments in economic sectors (NCPG; 2011: F.1.4.1). Vol. 2 of the PSDF indicates that the promotion of job creation in the green jobs industries (e.g. manufacturing of solar water heaters, maintenance of wind generators and solar energy infrastructure) would be promoted in the forthcoming spatial directives and strategies reports (Volumes 3-4).

Tourism

The PSDF notes that the tourism sector is identified in the Draft 4 PGDS as one of the key sectors with the capacity to 'grow, transform and diversify the provincial economy'. According to the PGDS, the vision for tourism is underpinned by a number of broad, essential and specific drivers. The 'broad drivers' consider the 'big picture' focusing on tourism's contribution to a larger development purpose, including overall economic growth, addressing social upliftment and poverty alleviation through facilitating job creation, and striving for more equitable ownership and participation in tourism through transformation.

Comparative advantages of the NCP are identified as mainly eco-tourism opportunities, including unique sectoral or nature-based routes; National parks, nature reserves and game reserves, Natural and cultural manifestations, as well as festivals and cultural events (PGNC; 2011b).

2.4 DISTRICT LEVEL PLANNING CONTEXT

2.4.1 John Taolo Gaetsewe District Municipality Integrated Development Plan 2007-2011

The vision of the JTGDM is "Working together towards a better life for all in the district". To enable the implementation of this vision the mission statement of the DM is "Accelerating the implementation of Integrated Development Initiatives and providing support to local municipalities".

The IDP lists a number of Key Performance Areas (KPA's). The KPA's that have a bearing on the proposed San PVSEF include:

KPA 1: Basic service delivery and infrastructure investment Electricity

This issue relates to the current backlogs in terms of energy provision, with specific reference to the need to deal with those members of the community that still do not

have access to electricity for cooking, heating and lighting purposes. In its broadest definition, this include energy saving.

KPA 2: Local Economic Development

It will also promote the economic growth of the area through LED, mining, agriculture and other related economic potentials and drivers and support SMME Development

The IDP identifies also four strategic objectives, within which the thirteen anchor projects were identified:

- Providing services to struggling communities;
- Developing infrastructure;
- Capacity building within the District Municipality;
- Local Economic Development

The IDP also refers to the District Growth and Development Strategy (DGDS) which aims to provide a framework for sustainable growth and economic development for the District over the next ten years. The key targets that are relevant to the proposed San PVSEF include:

- Maintain an average provincial annual growth rate of between 4%-6%;
- Halve the unemployment rate by 2014;
- Reduce the number of households living in absolute poverty by 5% per annum;
- Provide adequate infrastructure for economic growth and development by 2014

The DGDS focuses on 6 thrusts considered to be the main economic drive of the area. The following are of potential relevance to the proposed San PVSEF, specifically in terms of the establishment of a Community Trust (See Section 4).

Agriculture: Stimulate the agricultural sector through the sustenance of commercial farming by expanding the sector through variety of value adding initiatives. Linked to this is the transformation and development of subsistence farming through capacity-building, facilitating access to markets, finance, infrastructure, machinery, agro-processing technology and skills.

Infrastructure development: Identify infrastructure backlogs to enable the district municipality to intervene decisively through the provision of infrastructure services. The emphasis is in developing road networks that links economic activities within the District Municipality to cut the costs of doing business. Tied to this is the provision of basic services such as housing, telecommunications, water and sanitation, which are critical in jettisoning economic growth within the municipality.

Manufacturing: Identify manufacturing opportunities from other sectors, particularly mining and agriculture, linking such with the overall SMME's strategy in the municipality. Create export markets for regionally produced goods, both at national and international levels.

SMME development: Set clear SMME developmental goals in financing and supporting SMME's, targeting previously disadvantaged people, women, youth and people living with disabilities. This must find practical expression in municipal institutional arrangements and all social partners' outsourcing and procurement policies.

Tourism: Appraise the entire district tourism sector, including operators, products and services to enable social partners to identify critical intervention areas.

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides an overview of:

- The provincial socio-economic context;
- The district and local municipality level context, including information on key socio-economic indicators;
- Description of the site and the surrounding land uses.

3.2 PROVINCIAL CONTEXT

The proposed PVSEF is located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361,830 km², 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 DM⁵, twenty-six Category B municipalities and five district management areas. The site itself is located in the Gamagara LM (GLM) (NC453), one of the three LMs that make up the JTGDM.

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 km². 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 provincial 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, 18.5% to Gauteng and 12.8% to the Free State. 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 provincial population had no education at all, while 71.3% have primary or secondary education. Those with a higher educational

⁵ The John Taolo Gaetsewe DM was previously referred to as the Kalagadi DM

qualification accounted for 3.7% of the population (Figure 3.1). 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.

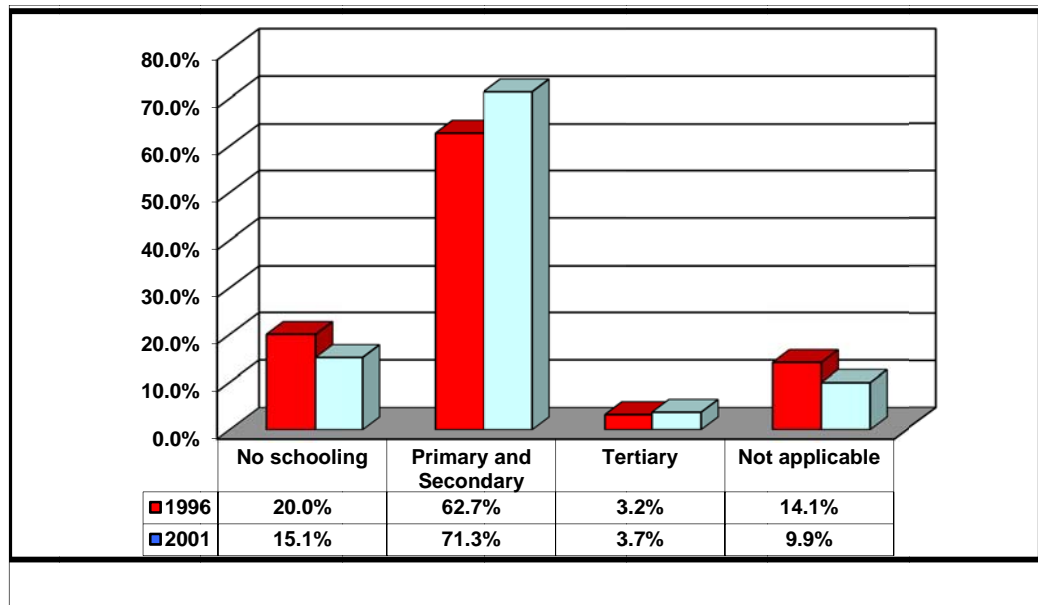


Figure 3.1: Percentage of people by level of education for 1996 and 2001
(Source: Northern Cape Province PGDS)

Economic development

The Human Development Index⁶ (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 HDI 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 and 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 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 near 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

⁶ 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.

in the Provincial Growth and Development Strategy (PGDS) document to measure poverty is the percentage of people living below the poverty line or breadline is used⁷. The poverty line indicates a lack of economic resources to meet basic food needs. Figure 3.2 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 Namaqua at 36%.

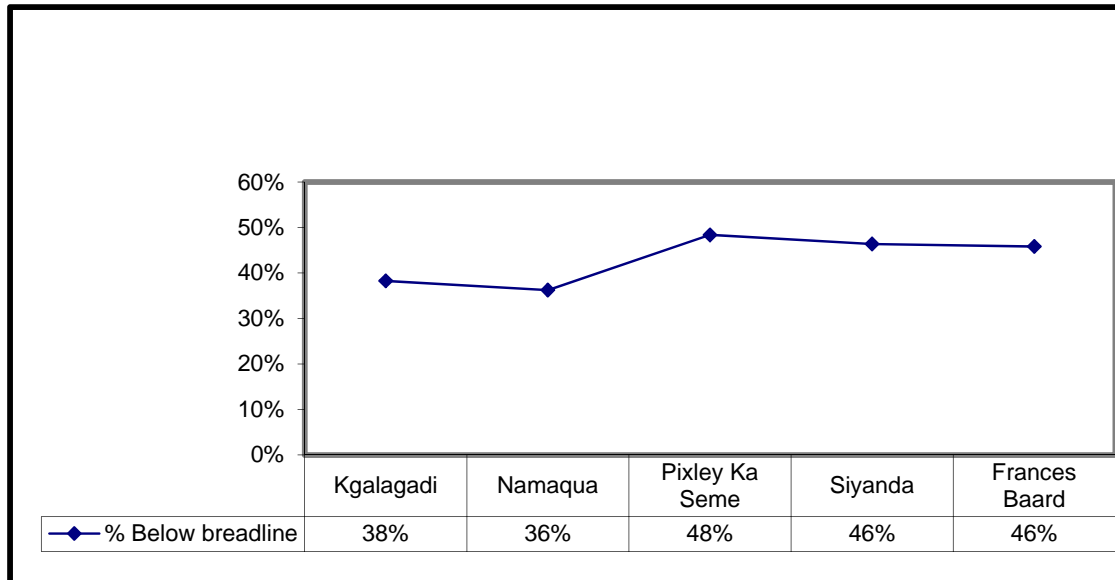


Figure 3.2: Percentage of household income below the poverty breadline by district (Source: Northern Cape PGDS)

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%.

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 GDPR. All the industries in the secondary sector have decreased in their contribution to the GDPR, 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 GDPR of the Northern Cape. At the same time the contribution to regional GDPR by industries in the tertiary sector increased, with the exception of the wholesale and retail industry, which decreased by 1.1%.

⁷ 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.

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 3.3).

Sectors	1996	1996 % of persons employed per sector	2001	2001 % of persons employed per sector
Primary				
Agriculture, hunting; forestry and fishing	48646	24.8	55016	28.4
Mining and quarrying	18556	9.5	15493	8.0
Secondary				
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
Tertiary				
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
Total		196219		193980

Table 3.3: Formal employment by sector (Source: Northern Cape PGDS)

3.3 SOCIO-ECONOMIC OVERVIEW OF THE PROPOSED PROJECT AREA

3.3.1 Introduction

As indicated in Section 1.5.2 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 GLM. The social baseline for this part of the study area is therefore described at a broader municipal level only.

The John Taolo Gaetsewe District Municipality (JTGDM) is located in the Northern Cape Province and borders on Botswana. The DM consists of three local municipalities, namely the Ga-egonyana, Gamagara, and Moshaweng Municipalities. Before March 2006 the area was a cross-border municipal area which straddled the Northern Cape Province and the North West Province. However, after re-demarcating the provincial boundaries the entire John Taolo Gaetsewe area was located in the Northern Cape Province.

The north-eastern region is comprised principally of high-density rural and peri-urban areas while the western and southern areas are sparsely populated and consist mainly of commercial farms and mining activities. The district consists of 186 settlements, the majority being in the Moshaweng municipal area. The main towns and villages within the district borders are Kuruman, Kathu, Deben, Dingleton, Olifansthoek, Van Zylsrus, Bothitong, Churchill, Manyeding, Laxey, Batlharos, Mothibistad, Hotazel and Heuningvlei. The main economic activity is mining, followed by agriculture, tourism and retail.

3.3.2 Demographic overview

Population

Based on the 2001 Census the total population for the DM was approximately 191 500, the majority of which reside in the Moshaweng municipal area. Of the total population 167 693 (87.5%) are Black African, 13 872 (7.2%) are Coloured and 9 864 (5%) are white. The total population of the Gamagara LM was 23 202, which made up 12% of the total population of the DM (Table 3.4). In terms of age structure, ~38% fall within the 0-14 age group, 57% within the economically active age group of 15-64 and the remaining 5% are older than 64. The gender split for the DM was 47.5% males and 52.5% females in 2001.

The data from the 2007 Census Survey indicates that the DM's population decreased to 173 454. However, the JTGDM IDP (2007-2011) indicates that the total population is in the region of 260 000, which represents a significant increase of ~ 65 000 people or 36% over the 2001 Census figure. It is assumed that the majority of this growth is linked to the recent rapid growth of the mining sector and expansion of Kathu. Setswana and Afrikaans, but specifically Setswana is by far the dominant languages in the district.

Municipality	Persons		Households	
	Census 2001	Comm Survey 2007	Census 2001	Comm Survey 2007
Gamagara LM	23,202	28,054	5,306	7,640
Moshaweng LM	91,708	70,012	19,995	15,479
Ga-Segonyana LM	70,392	39,791	17,163	17,106
District	191,539	173,454	44,218	42,151

(Source: Community Survey, 2007)

Table 3.4: Population figures for the John Taolo Gaetsewe District Municipality

Education

Based on the Census 2001 data the educational levels in the DM were relatively low, with 27.6% of the population having no formal education, while only 67.4% had some school education. Only 1.83% of the population has some tertiary education. The DM JTGDM IDP notes that these statistics have obvious implications for the employment potential of the population, and therefore also for the district's local economic development and job creation initiatives.

Income

Based on the 2001 Census 63% of the DMs households earned less than R800 per month, which is the figure used in South Africa to determine the poverty line. Of this total, 51% of the households had no source of income (Table 3.5). This is equivalent to ~ 32% of district's households. The JTGDM IDP (2007-2011) indicates that this is extremely high and places extreme pressure on the Municipalities operating in the district. The result of such high level of unemployment is that communities cannot pay for basic services and that severe pressure is put on municipal resources due to demands for services to a poverty-stricken population.

Category	District	Ga-Segonyana LM	Gamagara LM	Moshaweng LM	
No income		14,375	5,700	894	7,781
R1 - R4 800		4,828	1,839	667	2,322
R4 801 - R 9 600		9,210	3,268	983	4,959
R9 601 - R 19 200		6,163	2,428	930	2,805
R19 201 - R 38 400		4,422	1,978	998	1,446
R38 401 - R 76 800		2,937	1,350	906	681
R76 801 - R153 600		1,729	808	713	208
R153601-R307200		775	300	441	34
R307201-R614400		124	46	73	5
R614401-R1228800		45	16	23	6
R1228801-R2457600		66	21	22	23
R2 457 601 , more		13	5	6	2
Not Applicable		58	35	20	3

Table 3.5: Household income levels

3.3.3 Economic overview

Provincial economy

Although mining and agriculture are the main industries in the Northern Cape Province, this province has the smallest economy of the nine provinces. The Gross Geographic Product (GGP) represents approximately 1.8% of South Africa's GDP (SIA for Kathu and Sishen PVSEF, Batho Earth, November 2012). The trade sector, transport and finance industries also comprise a share in the provincial economy. Further promising industries are tourism, fishing and mariculture, although it is doubtful whether these could act as the drivers of the economy. There are thus significant potential for growth in the following sectors:

- Agriculture and agro-processing;
- Fishing;
- Mining and mineral processing;
- Transportation; and
- Manufacturing.

Local Economy

The economies of the JTGDM and GLM are largely dominated by mining, quarrying and agriculture. Recent expansions at the Kumba Sishen Iron Ore Mine and the establishment of the Khomani Mine contributed to the growth in the local economy. Furthermore, the agricultural sectors share in the local economy is also growing due to the promising grape production for export purposes, as well as the development taking place in the livestock and game farming sectors. Tourism is also fast becoming an important contributor to the local economy as more tourists are attracted to the distinguished desert landscape with relative accessibility (SIA for Kathu and Sishen PVSEF, Batho Earth, November 2012)..

3.4 SURROUNDING LAND USES

The proposed San PVSEF site is located in a rural/agricultural area of the north-eastern part of the Northern Cape Province, ~ 5 km north east of the town of Dibeng and 16 km south west of the Kathu (Photograph 3.1). The town of Kathu (meaning "town under the trees"/ "the place of peace and tranquillity") was established in 1974 and serves as the key service town for the large iron ore deposits in the area. The Sishen Iron Ore open pit mine near Sishen is Kumba's flagship operation and one of the largest open pit mines in the world (Photograph 3.2). Dibeng was established as a small settlement on the banks of the Ga-Mogara River which provided water for the smallholdings that run the full length of the town. The town was named by the Tswana speaking people meaning "first drinking place".



Photograph 3.1: View of Dibeng looking west from R380



Photograph 3.2: View Sishen Mine iron ore dumps

The topography of the site is flat, sloping gently towards the Gamagara River in the west. The highest point in the area is the road over rail-bridge located to the south of the site. There are a number of old dwellings on the site that could be converted and used as offices and workshops during both the construction and operational phase of the project (Photograph 3.4). The dominant land use in the area is farming, specifically beef cattle, sheep and goats. Stock theft is however a problem due to the proximity of the area to the residential areas of Dibeng and Kathu.

In addition to the proposed San PVSEF, two other PVSEF's are proposed on the farm Wincanton 472, which borders onto the town of Dibeng. Renewable Energy Investments South Africa (REISA) is proposing a PVSEF on Portion 4 of the farm Wincanton 472. This project is referred to as the Kathu Solar Energy Facility and has a capacity of ~ 100 MW and will be established within a broader area of 6 km^2 . VentuSA Energy is proposing a PVSEF on Portion 6 of the farm Wincanton 472. This project is referred to as the Sishen Solar Energy Facility and also has a capacity of 100 MW and will be established within a broader area of 7 km^2 . The location of the proposed REISA and VentuSA PVSEFs relative to the proposed SAN PVSEF are illustrated in Figure 3.1.



Photograph 3.3: Old farm buildings on the site

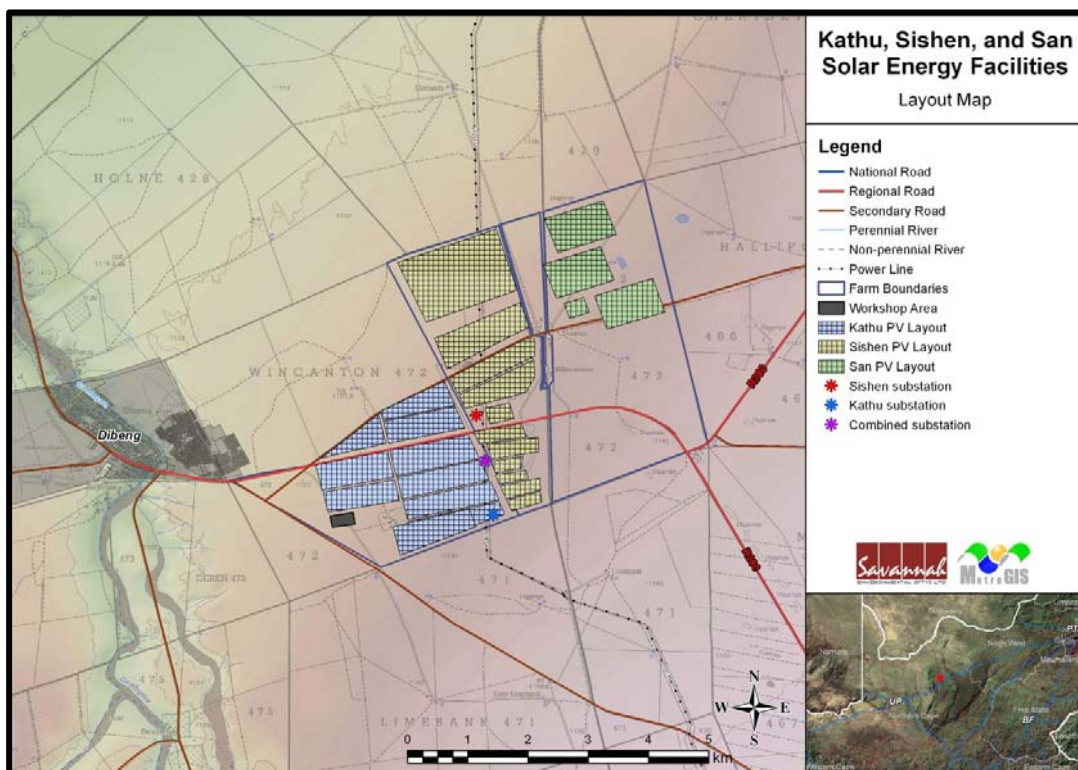


Figure 3.1: Location of San PVSEF (green) relative to Kathu (blue) and Sishen (yellow) PVSEF sites

The road (R380) between Dibeng and Kathu cuts across the southern portion of the property (Figure 3.1). This road links Dibeng and Kathu with the N14. The eastern boundary of the southern section of the site is formed a railway line, which runs in a north-south direction (Figure 3.1 and Photograph 3.4). The abandoned Wincanton railway siding is located on the eastern side of the railway line, to the south of the area proposed for the San PVSEF (green hatched area) (Photograph 3.5). Access to the proposed site is likely to be via the existing access road to the Wincanton railway siding from the R380. Neighbouring farms include the following Deben 473, Hallford 466, Limebank 471, Flatlands 529, Dundrum 475; and Farm 429.



Photograph 3.4: View of railway line looking north



Photograph 3.4: View of Wincanton railway siding

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

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 with renewable energy projects, including solar energy projects

In identifying the key issues the following assumption is made:

- The area identified for the proposed solar energy plant 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 infrastructure (access road, pipeline and 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)
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework, Vol. 2 (2011); and

- John Taolo Gaetsewe District Municipality Reviewed 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 energy generation in South Africa to renewables.

Based on this it is reasonable to assume that the establishment of PVSEFs is supported. The NCPGDS and JTGDM IDP also emphasise the importance of SMME development and the provision of economic infrastructure, which would include energy related infrastructure. However, the NCPGDS also states 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 Province's 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.

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
- Increased 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
- Threat to safety and security of farmers associated with the presence of construction workers on site
- Impact of heavy vehicles, including damage to roads, safety, noise and dust
- Potential loss of grazing land associated with construction-related activities.

4.4.1 Creation of employment and business opportunities

Based on the information from other PVSEF projects the construction phase for a 75MW PVSEF is expected to extend over a period of 12-18 months and create approximately 291 employment opportunities, depending on the final design. Of this total ~ 68% (198) will be available to low-skilled workers (construction labourers, security staff etc.) and

semi-skilled workers (drivers, equipment operators etc.) and 32% (93) to skilled personnel (engineers, land surveyors, project managers etc.). 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, access roads, services and power line.

The majority of low-skilled employment opportunities associated with the project are likely to benefit members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. The majority of the skilled and semi-skilled opportunities are likely to be associated with the contractors appointed to construct the proposed PVSEF and the 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. The low education and skills levels in the area will also hamper potential opportunities for local communities.

The capital expenditure on completion is anticipated to be in the region of R 1.35 billion for a 75 MW 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 solar plants the potential opportunities for the GLM economy are likely to be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kathu. 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 Free State to be realised. In this regard the FSPGDS highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Free State are low. The proposed PVSEF therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Free State Province.

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, etc. associated with the construction workers on the site. The majority of construction workers are likely to be accommodated in Kathu. This will create opportunities for local hotels, B&Bs, guest farms and people who want to rent out their houses. In addition, a proportion of the total wage bill earned by construction workers over the 18-24 month construction phase is also likely to be spent in the regional and local economy. The total wage bill for the construction phase is estimated to be in the region of R 60 million. This is based on the assumption that the average monthly salary for low skilled, semi-skilled and skilled workers will be in the region of R 4 000, R 8000 and R 25 000 respectively for a period of 15 months. A percentage of the wage bill will be spent in the local economy and will create opportunities for local businesses in Kathu. 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, etc. associated with the construction workers on the site. The benefits to the local economy will however be confined to the construction period (12-18 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.

The hospitality industry in Kathu 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 large 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

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	With Enhancement
Extent	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)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (32)	Medium (36)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement : See below		
Cumulative impacts: 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.		
Residual impacts: 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, San Solar Energy 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 San Solar Energy should meet with representatives from the GLM 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 San Solar 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

- San Solar 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, San Solar Energy should assist local BEE companies to complete and submit the required tender forms and associated information.
- The GLM, 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

The presence of construction workers poses a potential risk to family structures and social networks in the area. In addition there are a number of potentially vulnerable farming activities, such as livestock farming. The potential threat to farming activities is discussed below.

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)

Given the relatively small labour force (291) during the construction phase, of which approximately 200-220 can be sourced from the local area, the potential risk to local family structures and social networks is regarded as low.

Employing members from the local community to fill the low-skilled job categories will assist to reduce the risk and mitigate the potential impacts on the local communities. These workers will be from the local community and form part of the local family and social network and, as such, the potential impact will be low. The use of local residents to fill the low skilled job categories will also reduce the demand placed on local services (housing etc.) by construction workers. However, due to the potential mismatch of skills and low education levels, the potential employment opportunities for the members from these local communities may be low.

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

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	With Mitigation
Extent	Local (3) (Rated as 3 due to potential severity of impact on local communities)	Local (2) (Rated as 1 due to potential severity of impact on local communities)
Duration	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)
Magnitude	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)	Low for community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)
Probability	Probable (3)	Probable (3)
Significance	Low for the community as a whole (27) Moderate-High for specific individuals who may be affected by STD's etc. (57)	Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by STD's etc. (51)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	

Mitigation: See below
Cumulative impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.
Residual impacts: 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, San Solar 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;
- San Solar Energy should consider the establishment of a Monitoring Forum (MF) for the construction phase which should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers;
- San Solar Energy and the contractor should, in consultation with representatives from the MF, 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;
- San Solar 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;
- The contractor should make the necessary arrangements for allowing workers from outside the area to return home over weekends and or on a regular basis during the 6-12 month construction phase. This would reduce the risk posed by construction workers to local family structures and social networks;
- 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, poaching and damage to farm infrastructure

The presence of construction workers on the site increases the potential risk of stock theft and poaching. The movement of construction workers on and off the site also poses a potential threat to farm infrastructure, such as fences and gates, which may be

damaged. Stock and game losses may also result from gates being left open and/or fences being damaged.

With regard to the proposed San PVSEF, the local farmers interviewed said that stock theft was a problem in the area. This was due to the proximity of the farms to the Dibeng and Kathu. The presence of construction workers does therefore increase the risk of stock theft. The local farmers (Mr van der Walt) indicated that compensation should be paid for losses incurred. However, the local farmers also acknowledged that the presence of security personnel on the site during the construction and operational phase of the project may assist to reduce the incidence of stock theft. In this regard Mr van der Walt recommended that the option of establishing manned security boom at the entrance to the site should be investigated. This would apply to access road to the farm Bosaar, which is located to the west of the railway line.

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

Nature: Potential loss of livestock, poaching and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
Extent	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6) (Due to reliance on agriculture and livestock for maintaining livelihoods)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses etc.	Yes, compensation paid for stock losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes
Mitigation: See below		
Cumulative impacts: No, provided losses are compensated for		
Residual impacts: 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:

- San Solar Energy should enter into an agreement with the affected landowners whereby the company will compensate for damages to farm property and disruptions

to farming activities. This includes losses associated with stock theft and damage to property etc.;

- San Solar Energy should investigate the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. Should such a MF be required it should be established prior to commencement of the construction phase. The Code of Conduct should be signed by San Solar Energy and the contractors before the contractors move onto site;
- San Solar 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 the Code of Conduct to be signed between San Solar 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 Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;
- Contractors appointed by San Solar Energy should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by San Solar Energy should ensure that construction workers who are found guilty of stealing livestock, poaching and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;
- The housing of construction workers on the site should be limited to security personnel.

4.4.4 Increased risk of veld fires

The presence of construction workers and construction-related activities on the site poses an increased risk of veld fires that in turn pose a threat to the livestock, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened. The landowners interviewed identified that veld fires were an issue of concern. In this regard all of the farms in the area are dependent on grazing and any loss of grazing due to a fire would therefore impact negatively on the livelihoods of the affected farmers. The potential risk of veld fires is likely to be higher during the dry, winter months.

Table 4.4: Assessment of impact of increased risk of veld fires

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of veld fires		
	Without Mitigation	With Mitigation
Extent	Local (4) (Rated as 4 due to potential severity of impact on local farmers)	Local (2) (Rated as 2 due to potential severity of impact on local farmers)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate-High due to reliance on livestock for maintaining livelihoods (8)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (42)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: No, provided losses are compensated for.		
Residual impacts: See cumulative impacts.		

Assessment of No-Go option

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

Recommended mitigation measures

San Solar Energy should enter into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated veld fires. In addition, the potential increased risk of veld 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 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 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 communities in the area. However, the findings of the SIA indicate that the current road use frequency is low. The social impacts associated with the movement of construction related traffic are therefore likely to be low.

Table 4.5: Assessment of the impacts associated with construction vehicles

Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (15)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: 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.		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

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

Recommended mitigation measures

San Solar Energy should enter into an agreement with the affected landowners whereby the company will compensate for damages. This includes losses associated with damage to local internal farm roads that are affected by the site. In addition, the potential impacts associated with heavy vehicles and dust can be effectively mitigated. The aspects that should be covered include:

- The contractor must ensure that damage caused to 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 farmland

The activities associated with the construction phase have the potential to damage farmlands and result in a loss of land available for grazing. The significance of the impacts is to some extent mitigated by the fact that the farming activities on the site are confined to sheep farming as opposed to crops. In addition, only one landowner, Mr Bester is affected and he has entered into a lease agreement with San Solar Energy. The loss of production farmland would therefore be offset by such an agreement. Mr Bester also indicated that due to his age he was in the process of cutting back on his farming activities on the site. In addition, stock theft was an on-going problem. The impact on farmland associated with the construction phase (an operational phase) can therefore 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. Neither of the two adjacent farmers, Mr van der Walt and Mr Maritz raised any concerns regarding damage to farmland.

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

Nature: 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.		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Moderate, due to importance of farming in terms of local livelihoods (4)	Minor (2)
Probability	Definite (5)	Highly Probable (4)
Significance	High (60)	Low (20)
Status	Negative	Negative
Reversibility	No, in case of footprint associated with solar thermal plant	No, in case of footprint associated with solar thermal plant
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
Mitigation: See below		
Cumulative impacts: Overall loss of farmland could affect the livelihoods of the affected		

farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.

Residual impacts: 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 (CSIR);
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.5 SOCIAL IMPACTS ASSOCIATED WITH THE 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;
- Benefits associated with the establishment of a community trust;
- The establishment of renewable energy infrastructure.

Potential negative impacts

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

4.5.1 Creation of employment and business opportunities

Based on the information from other PVSEF projects the proposed PVSEF will create ~ 60 permanent employment opportunities during the 20 year operational phase. Of this total ~ 30 (50%) will be low skilled (security and maintenance), 10 (17%) semi-skilled and 20 (33%) skilled employees. Due to the low education and skills levels in the area the potential employment opportunities for members from the local Kathu and Dibeng community are likely to be limited to the low and semi-skilled positions. However, it will be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the NCPGDS and the JTGDM IDP.

Given the location of the proposed facility the majority of permanent staff is likely to reside in Kathu and Dibeng. In terms of accommodation options, a percentage of the permanent employees may purchase houses in the town, while others may decide to rent. Both options would represent a positive economic benefit for the region. 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 20-year operational lifespan of the project.

The local hospitality industry in Kathu 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.

The Gamagara Local Economic Development (LED) Manager, Mr Herbert Motlonyane, indicated that the proposed development would support the local economic development in the area and create employment.

Table 4.7: Impact assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	With Enhancement
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Medium (33)
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: 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		
Residual impacts: 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. In addition:

- San Solar Energy should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.

4.5.2 Benefits associated with the establishment of a community trust

In terms of the Request for Proposal document prepared by the Department of Energy all bidders for operating licences for renewable energy projects must demonstrate how the proposed development will benefit the local community. This can be achieved by establishing a Community Trust which is funded by revenue generated from the sale for energy.

Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20 year period. This revenue can be used to fund development initiatives in the area and support the local community. The long term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed PVSEF plant can be used to support a number of social and economic initiatives in the area, including:

- Creation of jobs;
- Education;
- Support for and provision of basic services;
- School feeding schemes;
- Training and skills development;
- Support for SMME's.

In addition, the establishment of a PVSEF plant is not likely to have a significant impact on the current agricultural land uses that underpin the local economic activities in the area. The loss of this relatively small area will not impact on the current and future farming activities. Experience has however also shown that Community Trusts can be mismanaged. This issue will need to be addressed in order to maximise the potential benefits associated with the establishment of a Community Trust.

The Gamagara LED Manager and Planner (Mr Motlonyane and Mr Burger) recommended that instead of establishing a new Community Trust, San Solar Energy should investigate linking the project with the existing Gamagara Development Trust. This Trust has been in operation for ~ 10 years and is has representatives from the local communities, mining companies and Gamagara LM on the board of trustees. The benefit of this option would be linking up with an existing and established structure. This would assist to address the potential concerns regarding mismanagement of funds etc.

Table 4.8: Assessment of benefits associated with establishment of a community trust

Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	Without Mitigation	With Enhancement⁸
Extent	Local (2)	Local and Regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Definite (5)
Significance	Medium (30)	High (70)
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Promotion of social and economic development and improvement in the overall well-being of the community		
Residual impacts: 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 supporting the social and economic development in the area would be lost. This would also represent a negative impact.

Recommended enhancement measures

In order to maximise the benefits and minimise the potential for corruption and misappropriation of funds the following measures should be implemented:

- San Solar Energy should meet the representatives of the Gamagara Development Trust and investigate how the proposed San PVSEF can contribute to the Development Trust;
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;
- Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the community trust from the PVSEF plant.

4.5.3 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. The establishment of a clean,

⁸ Enhancement assumes effective management of the community trust

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.

However, the overall contribution of the proposed San PVSEF to South Africa's total energy requirements will be small (75MW). In addition, the current application is not unique. In this regard, a significant number of PVSEF developments are currently proposed in other parts of South Africa. The potential contribution of the proposed San PVSEF should therefore be regarded as valuable, but should not be overestimated.

The Gamagara LED Manager and Planner (Mr Motlonyane and Mr Burger) indicated that the development of Kathu and Dibeng was being constrained by the inability of Eskom to meet the growing energy needs. In this regard a number of developments, including a small industrial park in Dibeng, have had to be put on hold. The establishment of a PVSEF in the area would therefore hopefully assist to address the current energy shortfall in the area. This would in turn also benefit the future growth and development of Kathu and Dibeng.

Table 4.9: Development of clean, renewable energy infrastructure

Nature: Promotion of clean, renewable energy		
	Without Mitigation	With Mitigation (The provision of renewable energy infrastructure is in itself a mitigation measure)
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (40)	Medium (48)
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
Residual impacts: 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 maximise the benefits of the proposed project San Solar Energy should:

- Implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project;

4.5.4 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. 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. Based on the observations during the site visit the visual impacts associated with the proposed San PVSEF are likely to be low.

The potential visual impacts will also to some extent be mitigated by the existing infrastructure in the site, including the railway line and the power lines to the west of the site.

Table 4.10: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed solar facility and the potential impact on the areas rural sense of place.		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Reversibility	Yes, solar facility can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Potential impact on current rural sense of place		
Residual impacts: 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.

4.5.5 Impact on tourism

The NCPGDS identifies tourism as one of the key economic drivers in the province. Caution should therefore be taken to ensure that the development of renewable energy

projects, such as the proposed San PVSEF, do not affect the tourism potential of the Province. However, based on the findings of the site visit, the proposed facility is not likely to impact on the tourism sector in the area or the Province. This is due to the sites location and the existence of existing infrastructure in the site, including the railway line and power lines. In addition, the visual quality of the area has been impacted by the over burden and processing dumps associated with the iron ore mines in the area. The significance of this issue is therefore rated as low negative. In some instances the plant may also attract tourists to the area. However, the significance of this potential benefit is also rated as low positive.

Table 4.11: Impact on tourism

Nature: Potential impact of the solar thermal plant on local tourism		
	Without Mitigation	With Enhancement / Mitigation
Extent	Local (2)	Local (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24) (Applies to both - and +)	Low (27) (Applies to both - and +)
Status	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Potential negative and or positive impact on tourism in the Kai! Garib Municipality Area.		
Residual impacts: 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:

- San Solar Energy should liaise with representatives from the GLM and local tourism representatives to raise awareness of the proposed facility;

- San Solar Energy 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 a 132 kV power line linking the on-site substation to the Eskom grid. The potential social impacts associated with the overhead power line are linked to the visual impact and associated impact on the sense of place and landscape character of the area. The findings of the SIA indicate that the significance of this impact is rated as low negative. This is due to the short length of the line required and the presence of existing power lines that traverse the site and the lines associated with the electrified railway line that runs along the western boundary of the site.

Table 4.12: Assessment of transmission line options

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

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 negative social cost. However, as indicated above, the overall contribution of the proposed San PVSEF to South Africa's total energy requirements will be small (75MW). In addition, the current application is not unique. The potential contribution of the proposed San PVSEF should therefore be regarded as valuable, but should not be overestimated.

The No-Development option would also result in the loss of the benefits to the local community and economy associated with the creation of employment opportunities and the establishment of a Community Trust. This would represent a negative social impact. Also, as indicated above, the No-Development option would exacerbate the current energy supply challenges facing the area.

Table 4.13: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy. The No-Development option would also result in the loss of the benefits to the local community and economy associated with the creation of employment opportunities and the establishment of a Community Trust.		
	Without Mitigation	With Enhancement
Extent	Local-Regional (2)	Local-Regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (6)	Medium (6)
Probability	Probable (3)	Highly Probable (4)
Significance	Moderate (36)	Moderate (56)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		
Residual impacts: 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.

4.8 ASSESSMENT OF CUMULATIVE IMPACTS

Although there appear to be no guidelines for solar facilities, the Australian Wind Farm Development Guidelines (Draft, July 2010) indicate that the cumulative impact of multiple wind farm facilities is likely to become an increasingly important issue for wind farm developments in Australia. This finding is also likely to apply to solar energy plants and is also likely to be the case in South Africa. The key concerns in terms of cumulative impacts are, as in the case of wind farms, also likely to be linked to visual impacts and the impact on rural, undeveloped landscapes.

The Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues raised in these guidelines as to what defines a cumulative impact are also regarded as pertinent to solar facilities, specifically given that the key issue of concern is likely to relate to the impact on rural, undeveloped landscapes. The relevant issues raised in the by Scottish Natural Heritage include:

- Combined visibility (whether two or more wind farms (solar facilities) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms (solar facilities) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (solar facilities) in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

The guidelines also note that cumulative impacts need to be considered in relation to dynamic as well as static viewpoints. The experience of driving along a tourist road, for example, needs to be considered as a dynamic sequence of views and visual impacts, not just as the cumulative impact of several developments on one location. The viewer may only see one wind farm (solar facility) at a time, but if each successive stretch of the road is dominated by views of a wind farm (solar facility), then that can be argued to be a cumulative visual impact (National Wind Farm Development Guidelines, DRAFT - July 2010). It is reasonable to assume that these issues will also apply to solar thermal plants.

Research on wind farms undertaken by Warren and Birnie (2009) also highlights the visual and cumulative impacts on landscape character. The paper notes that given that aesthetic perceptions are a key determinant of people's attitudes, and that these perceptions are subjective, deeply felt and diametrically contrasting, it is not hard to understand why the arguments become so heated. Because landscapes are often an important part of people's sense of place, identity and heritage, perceived threats to familiar vistas have been fiercely resisted for centuries. The paper also identifies two factors that important in shaping people's perceptions of wind farms' landscape impacts. The first of these is the cumulative impact of increasing numbers of wind farms (Campbell, 2008). The research found that if people regard a region as having 'enough' wind farms already, then they may oppose new proposals. The second factor is the cultural context. This relates to people's perception and relationship with the landscape. In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The concerns raised with regard to wind farms and the impact on landscapes are also likely to apply to solar facilities.

The impact of solar facilities on the landscape is therefore likely to be a key issue in South Africa, specifically given South African's strong attachment to the land and the growing number of solar plant applications. In the case of the proposed San PVSEF, two other PVSEF's are proposed on the farm Wincanton 472, which borders onto the town of Dibeng. Renewable Energy Investments South Africa (REISA) is proposing a PVSEF on Portion 4 of the farm Wincanton 472. This project is referred to as the Kathu Solar Energy Facility and has a capacity of ~ 100 MW and will be established within a broader area of 6 km². VentuSA Energy is proposing a PVSEF on Portion 6 of the farm Wincanton 472. This project is referred to as the Sishen Solar Energy Facility and also has a capacity of 100 MW and will be established within a broader area of 7 km². The location of the proposed REISA and VentuSA PVSEFs relative to the proposed SAN PVSEF are illustrated in Figure 3.1.

Based on the findings of the site visit the potential cumulative impacts are likely to be low. This is due to the fact that all three PVSEFs are located on Wincanton Farm 472. The impacts are therefore concentrated on one site as opposed to be spread over a number of sites. The overall effect is therefore the establishment of a single, large PVSEF as opposed to three separate facilities. The potential cumulative impacts on the areas sense of place is also mitigated by the existing infrastructure on the site and the mine related overburden and the mine dumps in the area. The visual integrity of the area has therefore been altered.

However, the relevant environmental authorities should be aware of the potential cumulative impacts when evaluating other applications in the area.

Table 4.14: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one solar thermal plant and the potential impact on the areas rural sense of place and character of the landscape.		
	Without Mitigation	With Mitigation
Extent	Local and regional (2)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (24)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: 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.		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

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

Recommended mitigation measures

The establishment of a number of large solar facilities in the area does have the potential to have a negative cumulative impact on the areas sense of place and the landscape. The environmental authorities should consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of such plants in an area.

4.9 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 20 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 (60) 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

The following mitigation measures are recommended:

- San Solar Energy should ensure that retrenchment packages are provided for all staff who stand to lose their jobs when the plant is decommissioned;
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;
- San Solar Energy should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

SECTION 5: KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

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

- 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 relevant literature on social and economic impacts;
- The experience of the authors with other renewable 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)
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework, Vol. 2 (2011); and
- John Taolo Gaetsewe District Municipality Reviewed Integrated Development Plan (2007-2011)

The findings of the review indicated that solar energy was strongly supported at a national and 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 energy generation in South Africa to renewables.

Based on this it is reasonable to assume that the establishment of PVSEFs is supported. The NCPGDS and JTGD IDP also emphasise the importance of SMME development and the provision of economic infrastructure, which would include energy related infrastructure. However, the NCPGDS also states 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 Province's 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.

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.

The construction phase is expected to extend over a period of 18-24 months and create approximately 291 employment opportunities. Of this total ~ 68% (198) will be available to low-skilled workers (construction labourers, security staff etc.) and semi-skilled workers (drivers, equipment operators etc.) and 32% (93) to skilled personnel (engineers, land surveyors, project managers etc.). The majority of low-skilled employment opportunities associated with the project are likely to benefit members from the local community. In this regard the majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. The low education and skills levels in the area may however hamper potential opportunities for local communities. The majority of the skilled and semi-skilled opportunities are likely to be associated with the contractors appointed to construct the proposed PVSEF and the 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. 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.

The total wage bill for the 18-24 month construction phase will be in the region of R 60 million. The injection of income into the area in the form of wages and rental for accommodation will create opportunities for local businesses in Kathu. 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, etc. associated with the

construction phase. The benefits to the local economy will be confined to the construction period (18-24 months).

The capital expenditure is anticipated to be in the region of R 1.35 billion for a 75 MW facility. However, given the technical nature of the project and high import content associated with PVSEF the potential opportunities for the GLM economy will be limited. However, opportunities are likely to exist for local contractors and engineering companies in Kathu. Implementing the enhancement measures listed below can enhance these opportunities.

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 majority of potential negative impacts with mitigation was assessed to be of Low significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. However, the impact on individuals who are directly impacted on by construction workers and or job seekers (i.e. contract HIV/ AIDS) was assessed to be of Medium-High negative significance. At a community level the potential risk posed by construction workers and or job seekers was found to be low. This was due to the relatively small size of the construction force (291) and the likelihood that 200-220 could be sourced locally. The potential risk to local family structures and social networks is therefore likely to be low. Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	Medium (Positive impact)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)	Low (Negative impact for community as a whole) Medium-High (Negative impact of individuals)
Risk of stock theft, poaching and damage to farm infrastructure	Medium (Negative impact)	Low (Negative impact)
Risk of veld fires	Medium (Negative impact)	Low (Negative impact)
Impact of heavy vehicles and construction activities	Low (Negative impact)	Low (Negative impact)
Loss of farmland	High (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;
- Benefits associated with the establishment of a community trust.
- The establishment of infrastructure to generate renewable energy.

The total number of permanent employment opportunities is estimated to be in the region of 60. Of this total ~ 30 (50%) will be low skilled (security and maintenance), 10 (17%) semi-skilled and 20 (33%) skilled employees. The majority of the beneficiaries are therefore likely to be historically disadvantaged (HD) members of the community from Kathu and Dibeng. Over time it will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Northern Cape Provincial Growth and Development Strategy (NCPGDS) and (JTGDM) IDP.

The establishment of a Community Trust also creates an opportunity to support local economic development in the area. San Solar Energy has indicated that they are committed to establishment of a Trust. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20 year period. The revenue from the proposed PVSEF plant can be used to support a number of social and economic initiatives in the area, including:

- Creation of jobs;
- Education;
- Support for and provision of basic services;
- School feeding schemes;
- Training and skills development;
- Support for SMME's.

The long term duration of the revenue stream associated with a PVSEF linked Community Trust also enables local municipalities and communities to undertake long term planning for the area. Experience has however also shown that Community Trusts can be mismanaged. This issue will need to be addressed in order to maximise the potential benefits associated with the establishment of a Community Trust. In this regard San Solar Energy should investigate linking the project with the existing Gamagara Development Trust. The benefit of this option would be linking up with an existing and established structure. This would also assist to address the potential concerns regarding mismanagement of funds etc.

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 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 visual impacts on landscape character associated with large renewable energy facilities, such as solar thermal plants, are highlighted in the research undertaken by Warren and Birnie (2009). In the South African context, the majority of South Africans have a strong connection with and affinity for the large, undisturbed open spaces that are characteristic of the South African landscape. The impact of solar energy plants on the landscape is therefore likely to be a key issue in South Africa, specifically given South African's strong attachment to the land and the growing number of solar energy applications. The visual impacts associated with the proposed San PVSEF are, however, likely to be low due to its relatively small size (75MW) and its location. In addition, the visual character of the area has been impacted by the existing infrastructure on the site (electrified railway line and power lines) and mine dumps. 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

Impact	Significance No Mitigation	Significance With Mitigation
Creation of employment and business opportunities	Medium (Positive impact)	Medium (Positive impact)
Benefits associated with the establishment of a community trust	Medium (Positive impact)	High (Positive impact)
Establishment of infrastructure for the generation of renewable energy	Medium (Positive impact)	Medium (Positive impact)
Visual impact and impact on sense of place	Low (Negative impact)	Low (Negative impact)
Impact on tourism	Low (Positive and Negative)	Low (Positive and Negative)

5.2.4 Assessment of cumulative impacts

The cumulative impacts associated with solar energy facilities, such as the proposed San PVSEF, are largely linked to the visual impacts and the associated impact on the areas sense of place. In the case of the proposed San PVSEF, two other PVSEF's are proposed on the farm Wincanton 472. Renewable Energy Investments South Africa (REISA) is proposing a PVSEF on Portion 4 of the farm Wincanton 472. This project is referred to as the Kathu Solar Energy Facility and has a capacity of ~ 100 MW. VentuSA Energy is proposing a PVSEF on Portion 6 of the farm Wincanton 472. This project is referred to as the Sishen Solar Energy Facility and also has a capacity of 100 MW. The two proposed PVSEFs are located immediately to the west and south west of the SAN PVSEF.

Based on the findings of the site visit the potential cumulative impacts are likely to be low. This is due to the fact that all three PVSEFs are located on Wincanton Farm 472. The impacts are therefore concentrated on one site as opposed to being spread over a number of sites. The overall effect is therefore the establishment of a single, large PVSEF as opposed to three separate facilities. The potential cumulative impacts on the areas sense of place is also mitigated by the existing infrastructure on the site and the mine related overburden and the mine dumps in the area. The visual integrity of the area has therefore been altered.

However, it is recommended that the environmental authorities consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken with regard to the optimal number of solar thermal plants in the area.

In addition, the siting and number of individual components of the plant should be informed by findings of the relevant VIAs, specifically with respect to the visual impact on farmsteads and important roads in the area.

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 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 producer of carbon emissions in the world, this would represent a Medium 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 and the opportunity to establish a Community Trust. This also represents a negative social cost.

5.2.7 Decommissioning phase

Due to the relatively small number of people affected (~60) the social impacts associated with the decommissioning of the facility are likely to be low. In addition, the potential impacts can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

San Solar Energy should also investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The findings of the SIA indicate that the development of the proposed San PVSEF plant will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust funded by revenue generated from the sale of energy from the proposed PVSEF also creates an opportunity to support local economic development in the area. This represents a significant social benefit for an area where there are limited opportunities.

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 San PVSEF is therefore supported by the findings of the SIA.

5.4 IMPACT STATEMENT

The findings of the SIA undertaken for the proposed San PVSEF indicate that the development will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust also creates an opportunity to support local economic development in the area. 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.

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

Interviews

- AJ Bester, farm owner, 7/05/2012;
- Cassie van der Walt, adjacent farm owner, Bosaar Farm, 8/05/2012;
- Johan Maritz, adjacent farm owner, Vredeford Farm, 4/05/2012;
- Johann Burger, Gamagara LM Planner, 8/05/2012;
- Herbert Motlonyane, Gamagara LM, Local Economic Development Manager, 8/05/2012

References

- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Integrated Resource Plan (IRP) for South Africa (2010-2030);
- StatsSA Community Survey, 2007;
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework, Vol. 2 (2011); and
- John Taolo Gaetsewe District Municipality Reviewed Integrated Development Plan (2007-2011)
- The National Energy Act, 2008;
- The White Paper on Renewable Energy, November 2003;
- The White Paper on the Energy Policy of the Republic of South Africa, December 1998;

Internet sources

- www.demarcation.org.za (Census 2001 data);

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 PROGRAMME: SIA

CONSTRUCTION PHASE

Creation of employment and business opportunities

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

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised.	
Activity/risk source	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.	
Mitigation: Target/Objective	San Solar Energy, in discussions with the GLM, 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. San Solar Energy should also develop a database of local BEE service providers	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Attempt to employ a minimum of 80% of the low-skilled workers are sourced from the local area; Where required, implement appropriate training and skills development programmes prior to the initiation of the construction phase to ensure that 80% target is met. Skills audit to be undertaken to determine training and skills development requirements; Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities; Identify potential opportunities for local businesses 	<ul style="list-style-type: none"> San Solar Energy & contractors San Solar Energy San Solar Energy San Solar Energy San Solar Energy 	<ul style="list-style-type: none"> Employment and business policy document that sets out local employment targets to be in place before construction phase commences. Where required, training and skills development programmes to be initiated prior to the initiation of the construction phase. Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase commences. Database of potential local BEE services providers to be completed before construction phase commences.

Performance Indicator	<ul style="list-style-type: none"> • Employment and business policy document that sets out local employment and targets completed before construction phase commences; • 80% of semi and unskilled labour locally sourced. • Database of potential local BEE services providers in place before construction phase commences. • Skills audit to determine need for training and skills development programme undertaken within 1 month of commencement of construction phase.
Monitoring	<ul style="list-style-type: none"> • San Solar Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

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 PV facility, 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 affect 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"> • Attempt to ensure that a minimum of 80% of the low-skilled workers are sourced from the local area. This should be included in the tender documents. Construction workers should be recruited from the local area in and around the Kathu. • Local construction workers should be able to provide proof of having lived in the area for five years or longer. • Identify local contractors 	<ul style="list-style-type: none"> • San Solar Energy and contractors • San Solar Energy • San Solar 	<ul style="list-style-type: none"> • Identify suitable local contractors prior to the tender process for the construction phase. • Tender documents for contractors include conditions set out in SIA, including transport of workers home over weekends, transportation of workers home on completion of construction phase, establishment of MF etc.,

<p>who are qualified to undertaken the required work.</p> <ul style="list-style-type: none"> • Develop a Code of Conduct to cover the activities of the construction workers housed on the site. • Ensure that construction workers housed 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 out in the Code of Conduct. • Ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct. • 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. • Provide opportunities for workers to go home over weekends. The cost of transporting workers home over weekends and back to the site should be borne by the contractors. • On completion of the construction phase all construction workers must be transported back to their place of origin within two days of their contract ending. The costs of transportation must be borne by the contractor. 	<p>Energy</p> <ul style="list-style-type: none"> • San Solar Energy • San Solar Energy and contractors • San Solar Energy and contractors • Contractors • Contractors • Contractors 	<ul style="list-style-type: none"> • MF established before construction phase commences. • Code of Conduct drafted before construction phase commences. • Briefing session for construction workers held before they commence work on site.
<p>Performance Indicator</p>	<ul style="list-style-type: none"> • Employment policy and tender documents that sets out local employment and targets completed before construction phase commences; • 80% of semi and unskilled labour locally sourced; • Local construction workers employed have proof that they have lived in the area for five years or longer; • Tender documents for contractors include recommendations for construction camp; • MF set up prior to implementation of construction phase; 	

	<ul style="list-style-type: none"> • Code of Conduct drafted before commencement of construction phase; • Briefing session with construction workers held at outset of construction phase;
Monitoring	<ul style="list-style-type: none"> • San Solar Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

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.

Project component/s	Construction and establishment activities associated with the establishment of the PV facility, including infrastructure etc.	
Potential Impact	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.	
Activity/risk source	The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.	
Mitigation: Target/Objective	To avoid and or minimise the potential impact on local communities and their livelihoods.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> • Consider establishing a MF with the adjacent farmers and develop a Code of Conduct for construction workers. • Inform all workers of the conditions contained in the Code of Conduct. • 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. • Compensate farmers / community members at full market related replacement cost for any losses, such as livestock, damage to infrastructure etc. 	<ul style="list-style-type: none"> • San Solar Energy and contractors • San Solar Energy • San Solar Energy and contractor • Contractors 	<ul style="list-style-type: none"> • Establish MF before construction phase commences. • Develop Code of Conduct prior to commencement of construction phase. The Code of Conduct should be signed by San Solar Energy and the contractors before the contractors move onto site; • Inform all construction workers of Code of Conduct requirements before construction phase commences. • Compensate farmers / community members within 1 month of claim being verified by San Solar Energy and or Contractor/s.
Performance Indicator	<ul style="list-style-type: none"> • Community MF in place before construction phase commences. • Code of Conduct developed and approved prior to commencement of construction phase. 	

	<ul style="list-style-type: none"> All construction workers made aware of Code of Conduct within first week of being employed. Compensation claims settled within 1 month of claim being verified by Community MF.
Monitoring	<ul style="list-style-type: none"> San Solar Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

Increase risk of veld fires

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

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

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.

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

	of construction phase and up-dated on a monthly basis.
Monitoring	<ul style="list-style-type: none"> San Solar Energy and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

Impact on farming activities

OBJECTIVE: To avoid and or minimise the potential impact on current and future farming activities during the construction phase.

Project component/s	Construction phase activities associated with the establishment of the PV facility and associated infrastructure.	
Potential Impact	The footprint of the solar energy plant and associated infrastructure will result in a loss of land that will impact on farming activities on the site.	
Activity/risk source	The footprint taken up by the solar energy plant and associated infrastructure.	
Mitigation: Target/Objective	To minimise the loss of land taken up by the PV facility and associated infrastructure and to enable farming activities to continue where possible, specifically grazing.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> Minimise the footprint of the PV facility and the associated infrastructure. Rehabilitate disturbed areas on completion of the construction phase. Details of the rehabilitation programme should be contained in the EMP. 	<ul style="list-style-type: none"> Contractor and San Solar Energy ECO and Contractors 	<ul style="list-style-type: none"> Footprint for PV facility should be defined in the Construction EMP before construction phase commences. Rehabilitation should be on-going and completed within 3 months of the completion of the construction phase. Meeting/s with local farmers to discuss lease options should take place during the construction phase.
Performance Indicator	<ul style="list-style-type: none"> Footprint of PV facility included in the Construction Phase EMP. Meeting/s held with farmers during construction phase. 	
Monitoring	<ul style="list-style-type: none"> ECO must monitor indicators listed above to ensure that they have been met for the construction phase. 	

OPERATIONAL PHASE

Creation of employment and business opportunities

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

Project component/s	Day to day operational activities associated with the PV facility, including maintenance etc.	
Potential Impact	The opportunities and benefits associated with the creation of local employment and business should be maximised	
Activity/risk source	The operational phase of the PV facility will create approximately 60 full time employment opportunities.	
Mitigation: Target/Objective	In the medium to long term employ as many locals as possible to fill the full time employment opportunities.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> The workforce of 60 permanent staff is likely to be based in Kathu. San Solar Energy should commit to implementing a 5-year training and skills development and training programme to maximise employment for locals. Identify local members of the community who are suitably qualified or who have the potential to be employed full time. 	<ul style="list-style-type: none"> San Solar Energy San Solar Energy 	<ul style="list-style-type: none"> Develop 5 year training and skills development programme during the construction phase Identify local members of the community who are suitably qualified or who have the potential to be employed full time during the construction phase.
Performance Indicator	<ul style="list-style-type: none"> 5 year training and skills development programme developed and designed before construction phase completed. Potential locals identified before construction phase completed. 	
Monitoring	<ul style="list-style-type: none"> San Solar Energy must monitor indicators listed above to ensure that they have been met for the operational phase. 	

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 PV facility		
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 (60) 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 PV facility		
Mitigation: Target/Objective	To avoid and or minimise the potential social impacts associated with decommissioning phase of the PV facility.		
Mitigation: Action/control	Responsibility	Timeframe	
<ul style="list-style-type: none"> Retrenchments should comply with South African Labour legislation of the day 	<ul style="list-style-type: none"> San Solar Energy 	<ul style="list-style-type: none"> When PV facility is decommissioned 	
Performance Indicator	<ul style="list-style-type: none"> South African Labour legislation relevant at the time 		
Monitoring	<ul style="list-style-type: none"> San Solar Energy and Department of Labour 		