SOCIAL IMPACT ASSESSMENT

GRID CONNECTION INFRASTRUCTURE FOR THE PROPOSED BLOEMSMOND SOLAR ENERGY FACILITIES

NORTHERN CAPE PROVINCE

JULY 2019

Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

CapeEAPrac was appointed by Bloemsmond Grid (Pty) Ltd to manage the Basic Assessment (BA) process for the grid connection infrastructure associated with the five proposed Bloemsmond PV Solar Energy Facilities (SEF). The proposed grid connection infrastructure is located approximately 30 km south west of Upington and 16 km north east of Keimoes in the Northern Cape Province. The study area is situated within the Kai! Garib Local Municipality (KGLM), which is located within the ZF Mgcawu District Municipality (ZFMDM).

Tony Barbour Environmental Consulting was appointed by CapeEAPrac to undertake a specialist Social Impact Assessment (SIA) as part of a Basic Assessment (BA) process. This report contains the findings of the SIA for the grid connection infrastructure for the proposed Bloemsmond SEFs.

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 have been endorsed by the national Department of Environmental Affairs (DEA), and 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 key social issues related to the proposed development. This requires consultation with affected individuals and communities;
- Assessing and documenting the significance of social impacts associated with the proposed intervention;
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of demographic data from the 2011 Census Survey and other more recent data;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the site visit to the area and interviews with key stakeholders;
- Review of information from similar projects;
- Identification of social issues associated with the proposed project.

SUMMARY OF KEY FINDINGS

The assessment section is divided into:

- Assessment of compatibility with relevant policy and planning context ("planning fit");
- Assessment of social issues associated with the construction phase;
- Assessment of social issues associated with the operational phase;
- Assessment of social issues associated with the decommissioning phase;
- Assessment of power line alignments;
- Assessment of the "no development" alternative;
- Assessment of cumulative impacts.

The findings of the SIA indicate that the location of the substations (3, 4, 5 and the Bloemsmond Collector substation), including the alternatives for substation 4 and 5, has no bearing on the nature and significance of the social impacts. Likewise, the nature and significance of the social impacts associated with each of the proposed power lines, including the alternatives identified for B4BC, B5BC and the Collector to the MTS, are the same. Separate assessments for each substation and the power line alternatives have therefore not been undertaken.

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all make reference to renewable energy. The proposed SEFs and associated grid connection infrastructure also support a number of objectives contained in the NCP Provincial Growth and Development Strategy and the ZFMDM and KGLM IDP, specifically promotion of socio-economic development, SMME's, job creation and private sector investment. The KGLM also identifies solar energy as a growth opportunity within the local economy.

The Bloemsmond site is also located within the Upington REDZ, which was formally gazetted in 2018[1]. The area has therefore been identified as suitable for the establishment of renewable energy facilities and the associated grid connection infrastructure.

CONSTRUCTION PHASE

The key social issues associated with the construction phase of the grid connection infrastructure will be same as the issues associated with the establishment of the proposed SEFs. In this regard the construction activities associated with the establishment of the grid connection infrastructure are likely to overlap with and be undertaken at the same time as the construction activities associated with the establishment of the five proposed Bloemsmond SEFs. It is also reasonable to assume that the majority of construction related activities associated with the construction of the grid connection infrastructure will be undertaken by the same team of construction workers appointed to establish the proposed SEFs. It is therefore not possible to fully separate and distinguish between the social impacts associated with the construction phase of the proposed SEFs and the associated grid connection infrastructure. In addition, one must also be aware of double counting.

[1] GN 113 and GN114 of 2018

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.

For the purposes of the SIA it is assumed that ~ 20% (60) of the 300 construction workers employed during the establishment of the SEF would also be involved in the establishment of the grid connection infrastructure. It is also assumed that the construction activities would take place during the same 14-18 month period that the SEF is being constructed.

Members from the local communities in the area, including Bloemsmond, Curriescamp and Soverby, would be in a position to qualify for some of the low skilled and semi-skilled employment opportunities. The majority of these employment opportunities are likely to accrue to Historically Disadvantaged (HD) members from these local communities. Communities from the local towns in the area, including Keimoes and Upington and other towns in the KGLM, may also benefit.

Given high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. However, in the absence of specific commitments from the developer to maximise local employment targets, the potential opportunities for local employment will be limited. In addition, the low education and skills levels in the area may also hamper potential opportunities for local communities. Where feasible the implementation of a training and skills development programme prior to the commencement of construction would increase the potential to employ local community members.

The total wage bill for the construction phase for the individual SEFs was estimated to be in the region of R 50 million (2019 rand value). It is assumed that approximately 20 % of this (R 10 million) would be earned by the construction workers employed for the establishment of the grid connection infrastructure. A percentage of the wage bill (~R 10 million) will be spent in the local economy which will also create opportunities for local businesses in Keimoes and Upington and the KGLM.

The capital expenditure associated with the construction of grid connection infrastructure will create opportunities for local companies and the regional and local economy. However, given the technical nature of the project the opportunities for the local economy in the KGLM will be limited. However, opportunities may exist for local contractors and engineering companies in Upington. 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.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;

- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust and safety impacts of construction related activities and vehicles;
- Impact on productive farmland.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation were **Low Negative**. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

Impact	**Significance No Mitigation/Enhancement**	**Significance With Mitigation/Enhancement**
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative for community as a whole)	Low (Negative for community as a whole)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

OPERATIONAL PHASE

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- The establishment of grid connection infrastructure.
- Creation of employment opportunities;
- Benefits associated with the establishment of a Community Trust.

The benefits of the proposed Bloemsmond SEFs are dependent upon being able to connect to the national grid via the establishment of the grid connection infrastructure. Likewise the benefits associated with the establishment of a Community Trust are also dependent upon the ability generate revenue from the sale of renewable energy, which in turn is dependent upon being able to connect to the national grid. The benefits associated with the establishment of renewable energy infrastructure (including grid connection infrastructure) and Community Trust have been assessed as part of the SIAs for the proposed Bloemsmond SEFs. In order to

avoid double counting they have not been assessed as part of the SIA for the grid connection infrastructure. However, it is recognised that grid connection infrastructure is integral to the overall success of the proposed SEFs.

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

The significance of the potential negative impacts with mitigation was assessed to be of **Low Negative** significance. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. 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/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Low (Positive)	Low (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

CUMULATIVE IMPACTS

Cumulative impact on sense of place
There are a number of other power lines located and proposed in the vicinity of the grid connection infrastructure. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g. the effect of seeing two or more power lines along a single journey, e.g. road or walking trail) does therefore exist. However, the site is located within the Upington REDZ. The area has therefore been identified as being suitable for the establishment of large scale renewable energy facilities and the associated grid connection infrastructure.

However, the potential impact of solar facilities and the associated grid connection infrastructure on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of solar plant applications. With regard to the area, a number of SEFs have been proposed in the NCP. The Northern Cape Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications.

Cumulative impact on local services and accommodation
The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment of renewable energy facilities, including the associated grid connection infrastructure, on local services in nearby towns, such as Keimoes

and Upington, specifically services such as medical, education and accommodation. The significance of this impact with mitigation was rated as **Low Negative**.

Cumulative impact on local economy
The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment renewable energy facilities, including the associated grid connection infrastructure, on the local economy. The significance of this impact with enhancement was rated as **High Positive**.

DECOMMISSIONING

Given the relatively small number of people employed during the operational phase the potential negative social impact associated with decommissioning will be limited. In addition, 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**.

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producers of carbon emissions in the world, this would represent a High negative social cost. The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed grid connection infrastructure. This also represents a negative social cost.

However, at a provincial and national level, it should be noted that the SEF development proposal is not unique. In that regard, a significant number of renewable energy development, including SEFs, are currently proposed in the Northern Cape and South Africa. Foregoing the proposed SEF developments would therefore not necessarily compromise the development of renewable energy facilities in the NCP or South Africa. However, the socio-economic benefits the local communities in KGLM would be forfeited.

CONCLUSIONS AND RECOMMENDATIONS

The development of the grid connection infrastructure represents an integral part of the five proposed Bloemsmond SEFs. The findings of the SIAs for these SEFs indicate that they will create create employment and business opportunities for locals during both the construction and operational phase of the project. The benefits of the five proposed Bloemsmond SEFs are dependent upon being able to connect to the national grid via the establishment of the grid connection infrastructure. The establishment of the proposed SEFs was supported by the findings of the relevant SIAs.

The findings of the SIA for the grid connection infrastructure indicate that the significance of the potential negative impacts for both the construction and operational phase **Low Negative** with mitigation. All of the potential negative

impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of the grid connection infrastructure for the five Bloemsmond SEFs is therefore supported by the findings of the SIA. The grid connection infrastructure is also located within the Upington REDZ. The area has therefore been identified as being suitable for the establishment of large scale renewable energy facilities and the associated grid connection infrastructure.

The findings of the SIA also indicate that the location of the substations (3, 4, 5 and Bloemsmond Collector substation), including the alternatives for substation 4 and 5, has no bearing on the nature and significance of the social impacts. Likewise, the nature and significance of the social impacts associated with each of the proposed power lines, including the alternatives identified for B4BC, B5BC and the Collector to the MTS, are the same, namely **Low Negative** with mitigation. The decision regarding the preferred alternative for B4BC, B5BC and the Collector to the MTS should be informed by the findings of the VIA.

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ACRONYMS

DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
KGLM	Kai !Garib Local Municipality
KHLM	//Khara Hais Local Municipality
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
NC	Northern Cape
NCPPGDS	Northern Cape Province Provincial Growth and Development Strategy
NCSDF	Northern Cape Spatial Development Framework
MW	Megawatt
PGDS	Provincial Growth and Development Strategy
SDF	Spatial Development Framework
SEF	Solar Energy Facility
SIA	Social Impact Assessment
ZFMDM	ZF Mcgawu District Municipality

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

CapeEAPrac was appointed by Bloemsmond Grid (Pty) Ltd to manage the Basic Assessment (BA) process for the grid connection infrastructure associated with the five proposed Bloemsmond PV Solar Energy Facilities (SEF). The proposed grid connection infrastructure is located approximately 30 km south west of Upington and 16 km north east of Keimoes in the Northern Cape Province (Figure 1.1). The study area is situated within the Kai! Garib Local Municipality (KGLM), which is located within the ZF Mgcawu District Municipality (ZFMDM). The location of Bloemsmond 3, 4 and 5 are illustrated in Figure 1.2, 1.3 and 1.4 respectively.

Tony Barbour Environmental Consulting was appointed by CapeEAPrac to undertake a specialist Social Impact Assessment (SIA) as part of a Basic Assessment (BA) process. This report contains the findings of the SIA for the grid connection infrastructure component of the proposed Bloemsmond SEFs.

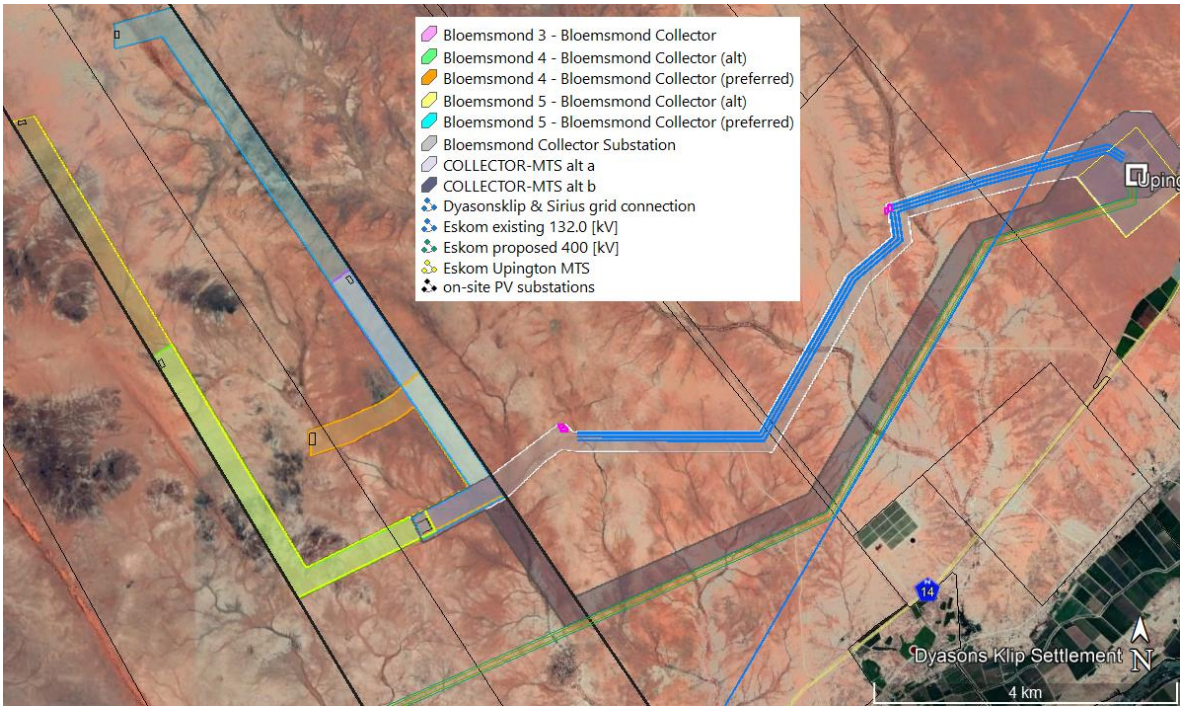

Figure 1.1: Location of grid connection infrastructure alternatives

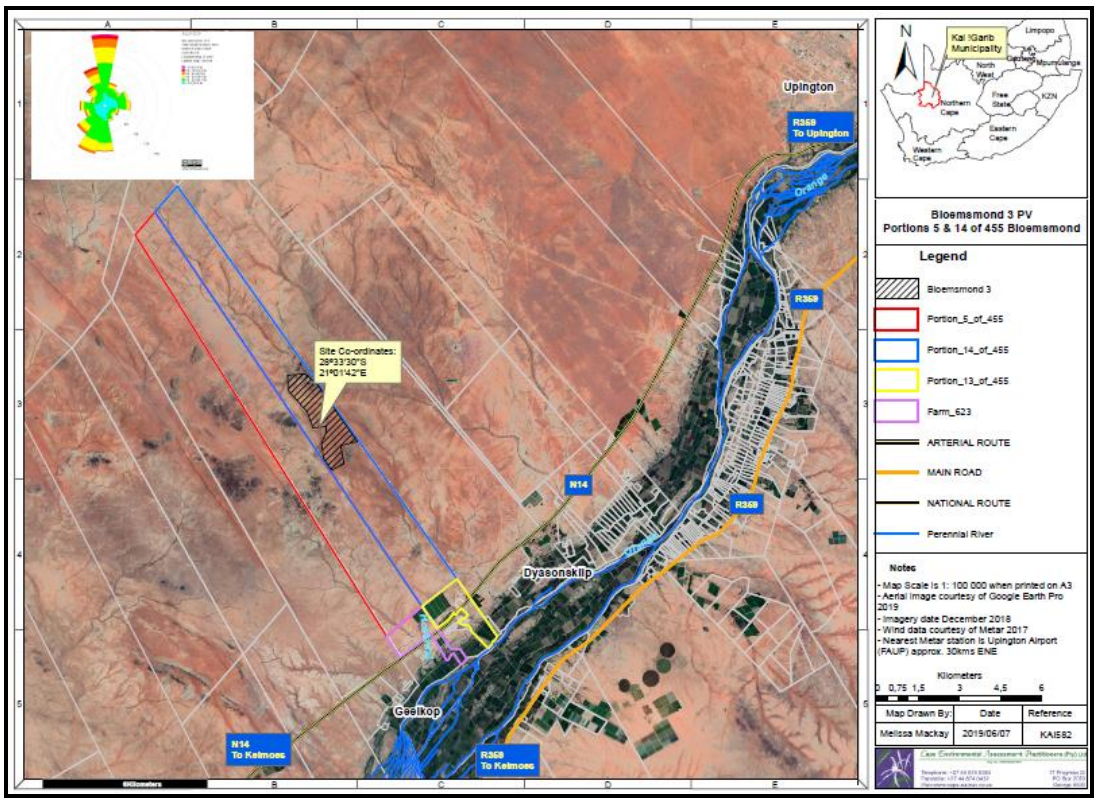

Figure 1.2: Location of Bloemsmond 3 100 MW SEF

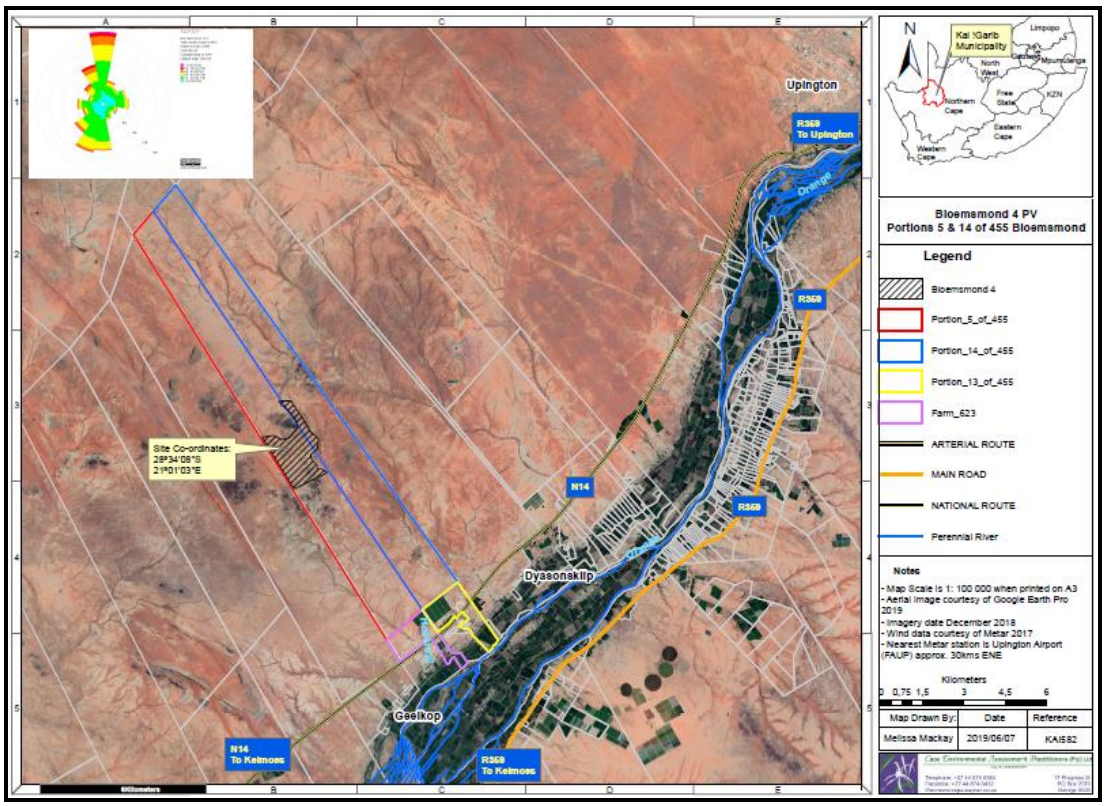

Figure 1.3: Location of Bloemsmond 4 100 MW SEF

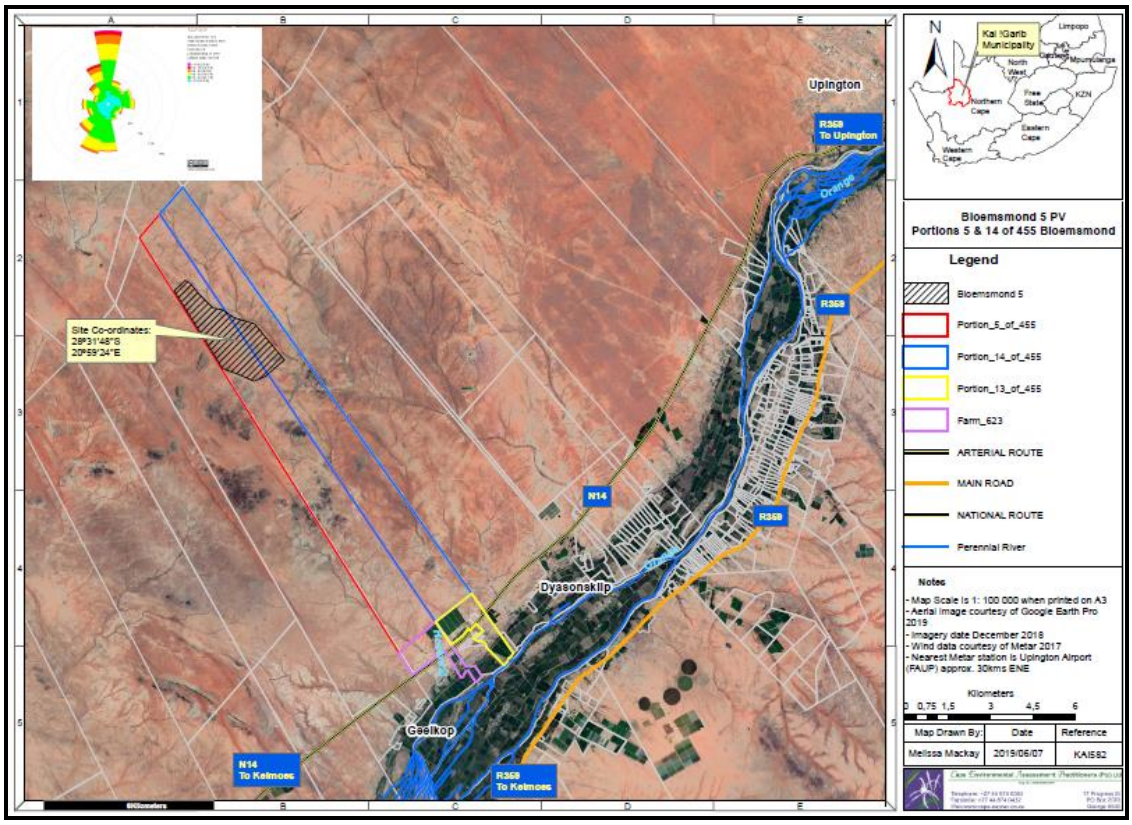

Figure 1.4: Location of Bloemsmond 5 100 MW SEF

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 grid connection infrastructure;
- A description and assessment of the potential social issues associated with the proposed grid connection infrastructure;
- Identification of enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

1.3 PROJECT DESCRIPTION

The Bloemsmond grid connection infrastructure will facilitate the connection of three facility substations associated with the proposed Bloemsmond 3, 4 and 5 SEFs to a collector substation associated with the proposed Bloemsmond 1 and 2 SEFs, and then a 132kV powerline to connect the collector substation to the National Grid via the Upington Main Transmission Substation (MTS) located to the east of Bloemsmond 455.

The following substations are required for the Bloemsmond grid connection infrastructure, namely:

- Bloemsmond 3 substation/ switching station: a maximum of 132kV;
- Bloemsmond 4 substation/ switching station: a maximum of 132kV;
- Bloemsmond 5 substation/ switching station: a maximum of 132kV; and
- Bloemsmond Collector substation: a maximum of 132kV.

There are two alternatives proposed for the Bloemsmond 4 and 5 substation/ switching stations, namely a western and an eastern alternative for each project.

Four overhead power lines are required for the Bloemsmond grid connection infrastructure:

- **B3BC:** a single circuit 33kV or 132kV line from Bloemsmond 3 substation/ switching station to the Bloemsmond Collector Substation;
- **B4BC:** a single circuit 33kV or 132kV line from Bloemsmond 4 substation/ switching station to the Bloemsmond Collector Substation;
- **B5BC:** a single circuit 33kV or 132kV line from Bloemsmond 5 substation to the Bloemsmond Collector Substation;
- **Collector-MTS:** a double circuit 132kV line from the Bloemsmond Collector Substation to the Upington MTS.

There are two alternative routes for B4**BC, B5BC** and C**ollector-MTS**:

B5BC Alternatives

- Preferred: a single circuit 33kV or 132kV line from Bloemsmond 4 eastern alternative substation running along the eastern boundary to the Bloemsmond Collector Substation
- Alternative: a single circuit 33kV or 132kV line from Bloemsmond 4 western alternative substation running along the western boundary to the Bloemsmond Collector Substation

B5BC Alternatives

- Alternative A: a single circuit 33kV or 132kV line from Bloemsmond 5 western alternative substation running along the western boundary to the Bloemsmond Collector Substation
- Alternative B: a single circuit 33kV or 132kV line from Bloemsmond 5 eastern alternative substation running along the eastern boundary to the Bloemsmond Collector Substation

Collector-MTS:

- Alternative A: via the approved/ constructed Dyasonsklip Substation and on to the Upington MTS
- Alternative B: southwards along the eastern boundary of Portion 14 of Farm Bloemsmond 455, and then running adjacent to the Eskom Aries-Upington 400kV servitude.

The grid connections cross the following properties:

- Portion 5 of Farm Bloemsmond 455;
- Portion 14 of Farm Bloemsmond 455;
- Remainder of Farm Dyasonsklip 454;
- Remainder of Farm Rooipunt 617;
- Remainder 638 Tungsten Lodge;
- Olyvenhouts Drift Settlement Agricultural Holding, Holding Number 1080.

1.4 SITE DESCRIPTION AND SURROUNDING LAND USES

The proposed Bloemsmond site is located approximately 25 km south west of Upington and 16 km to the north-east of Keimoes. Both towns are located on the northern banks of the Orange (Gariep) River (Photograph 1.1). The N14, which links the town of Keimoes to the south west and Upington to the north east, runs along the southern boundary of the farm. Access to the site is via the gravel road off the N14. The railway line between Keimoes and Upington is located to the north of the N14 (Photograph 1.2). The railway line is no longer in use. The site is traversed by the Oasis – Orange Eskom power line (Photograph 1.3). The adjacent landowners include:

- Farm Bloemsmond-Wes RE/623, located south east of the study area. The primary land use on the farm is grape cultivation;
- Remainder of the Farm Dyason's Klip 454, located east of the study area. Two PV solar energy facilities have been awarded preferred bidder status in round 4 of the REIPPPP, namely Dyason's Klip Solar 1 and Dyason's Klip Solar 2;
- Farm Geel Kop RE/456, located west of the study area. The farm is currently utilised for livestock farming and there are no homesteads or residents living on the farm;
- Farm RE/444, Farm RE/445 and Farm RE/446, located north-west of the study area. These farm portions are all owned by the same landowner. The farms are currently utilised for livestock and game farming and there are no homesteads or residents living on these farms.

Photograph 1.1: Orange River (Gariep)

Photograph 1.2: Rail way line to the south of the site adjancent to the N14

Photograph 1.3: Oasis-Oranje Eskom 132 kV line

The total property size of Portion 5 and Portion 14 of the farm Bloemsmond 455 is 4 829.8 ha. The two portions are located adjacent to each other and stretch away from the N14 in a north westerly direction for a distance of close on 18 km. The site is crossed by a number of small ephemeral water courses that drain into the Orange River to the south and south east. A small hill is located on Portion 14, approximately 6 km from the southern boundary (Photograph 1.4). The remainder of the site is relatively level and consists of sparse grasslands (Photograph 1.5). The southern section of Portion 14 also includes riverine woodland located along a drainage line (Photograph 1.6).

Photograph 1.4: Hill on Portion 14 with Abengoa CSP tower in the background

Photograph 1.5: Riverine woodland area

Photograph 1.6: View of southern portion of the site looking south towards Orange River

The nearest settlements to the site are the settlements of Bloemsmond (500 m south of the N14) and Kalksloot (located to the south and adjacent to the N14) (Photograph 1.7, 1.8 and 1.9). The turn-off to Cannon Island from the N14 is located to the south of the site. The settlement of Bloemsmond is accessed from the Cannon Island Road. There are a number of established farming related enterprises located at the intersection with the N14 (Photograph 1.10). The majority of houses in Bloemsmond and Klippunt are formal houses. However, there are a number of backyard structures.

Photograph 1.7: Bloemsmond

Photograph 1.8: Mobile clinic outside Bloemsmond Primary school

Photograph 1.9: Entrance to Kalksloot settlement

Photograph 1.10: Farm related infrastructure

In terms of land uses the area to the north of the N14, including Portion 5 and Portion 14 of the farm Bloemsmond 455, is predominately used for cattle and small stock (goats and sheep) farming (Photograph 1.11). However, there are irrigated vineyards located to the north of the N14 (Photograph 1.12). New vineyard areas are and have been established in this area in recent times (Photograph 1.13). Game farming is also practiced. In this regard the owner of Portion 5 and Portion 14 of the farm Bloemsmond 455 indicated that the northern sections of Portion 5 and 14 are used for game farming. The land uses in the area to the south of the N14 are dominated by vineyards (table and wine grapes).

A number of solar power projects are also located to the east of the site. Two PV solar energy facilities have been awarded preferred bidder status in round 4 of the REIPPPP on Farm Dyason's Klip 454, namely Dyason's Klip Solar 1 and Dyason's Klip Solar 2. The Abengoa Khi Solar 1 CSP project is also located to the east of the site (Photograph 1.14).

Photograph 1.11: Goats on Portion 5 of the farm Bloemsmond 455

Photograph 1.12: Vinyards located to the north of the N14

Photograph 1.13: New vineyard area established on Farm 623

Photograph 1.14: Abengoa Khi Solar 1 CSP

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, and 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 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 socio-economic data for the study area;
- 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 SIAs undertaken for other renewable energy projects;
- 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 general area. Annexure A contains a list of the secondary information reviewed and interviews conducted. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.6 ASSUMPTIONS AND LIMITATIONS

1.6.1 Assumptions

Technical suitability
It is assumed that the development site represents a technically suitable site for the establishment of a solar energy facility and the associated grid connection infrastructure.

Strategic importance of the project
The strategic importance of promoting solar energy is supported by the national and provincial energy policies.

Social impacts
The key social issues associated with the construction phase of the grid connection infrastructure will be same as the issues associated with the establishment of the proposed SEFs. In this regard the construction activities associated with the establishment of the grid connection infrastructure are likely to overlap with and be undertaken at the same time as the construction activities associated with the establishment of the five proposed Bloemsmond SEFs. It is therefore not possible to fully separate and distinguish between the social impacts associated with the construction phase of the proposed SEFs and the associated grid connection infrastructure.

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 solar energy facilities. The site

is also located within the Upington REDZ, which was formally gazetted in 2018[2]. The area has therefore been identified as suitable for the establishment of renewable energy facilities and the associated grid connection infrastructure.

1.6.2 Limitations

Demographic data

Some of the provincial documents do not contain data from the 2011 Census. However, where required the relevant 2011 Census data has been provided.

1.7 SPECIALIST DETAILS

Tony Barbour, the author of this report is an independent specialist with 24 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 250 SIA's and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Tony Barbour has also undertaken the specialist SIA studies for ~ 100 renewable energy projects, including SEFs. A Copy of Tony Barbour's CV is contained in Annexure C.

1.8 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the report, is independent and does not have a vested or financial interest in proposed project being either approved or rejected. A copy of a signed declaration of independence is provided in Annexure D

1.9 REPORT STUCTURE

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.

[2] GN 113 and GN114 of 2018

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the "policy and planning fit[3]" of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of "planning fit" conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of the meeting the objectives of the BA 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);
- The National Development Plan (2011);
- Astronomy Geographic Advantage Act (Act No 21 of 2007);
- Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa (CSIR);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy;
- Northern Cape Spatial Development Framework (2012);
- ZF Mcgawu District Municipality Integrated Development Plan (2017-2022);
- Kai! Garib Local Municipality Integrated Development Plan (IDP) (2018/19);

Due to the important economic and social role played by the town Upington information on the //Khara Hais Local Municipality is also provided. The SIAs undertaken for Bloemsmond 3, 4 and 5 SEFs include a review of the Renewable Energy Programme in South Africa. This review is not repeated in the SIA for the grid infrastructure.

2.2 NATIONAL POLICY ENVIRONMENT

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

[3] Planning fit" can simply be described as the extent to which any relevant development satisfies the core criteria of appropriateness, need, and desirability, as defined or circumscribed by the relevant applicable legislation and policy documents at a given time.

this regard, the preamble makes direct reference to renewable resources, including wind:

"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 SEF, 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.

2.2.3 White Paper on Renewable Energy

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

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol[4], 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. In this regard the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

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.

2.2.4 Integrated Energy Plan (2016)

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future

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

energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- Objective 1: Ensure security of supply;
- Objective 2: Minimise the cost of energy;
- Objective 3: Promote the creation of jobs and localisation;
- Objective 4: Minimise negative environmental impacts from the energy sector;
- Objective 5: Promote the conservation of water;
- Objective 6: Diversify supply sources and primary sources of energy;
- Objective 7: Promote energy efficiency in the economy; and
- Objective 8: Increase access to modern energy.

The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term;
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy;
- The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply;
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of renewable energy the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed

generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes, should be pursued.

In terms of existing electricity generation capacity the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

By 2020, various import options become available and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs.

In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy.

An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered.

In term of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution.

The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type

The IEP notes that a diversified energy mix with a reduced reliance on a single or a few primary energy sources should be pursued. In terms of renewable energy wind and solar are identified as the key options.

Wind

Wind energy should continue to play a role in the generation of electricity. Allocations to ensure the development of wind energy projects aligned with the IRP2010 should continue to be pursued.

Solar

- Solar should play a much more significant role in the electricity generation mix than it has done historically, and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV.
- Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.

With reference to the Renewable Energy Independent Power Producer (REIPP) Procurement Programme, the IEP notes:

- The REIPP Procurement Programme should be extended and new capacity should be allocated through additional bidding windows in order ensure the ongoing deployment of renewable energy technologies,;
- Experience and insights gained from the current procurement process should be used to streamline and simplify the process;
- The implementation of REIPP projects in subsequent cycles of the programme should be aligned with the spatial priorities of provincial and local government structures in the regions that are selected for implementation, in line with the Spatial Development Frameworks. This will ensure that there is long-term, sustainable infrastructure investment in the areas where REIPP projects are located. Such infrastructure includes bulk infrastructure and associated social infrastructure (e.g. education and health systems). This alignment will further assist in supporting the sustainable development objectives of provincial and local government by benefiting local communities.

The IEP indicates that Renewable Energy Development Zones (REDZs) have been identified and describe geographical areas:

- In which clusters (several projects) of wind and solar PV development will have the lowest negative impact on the environment while yielding the highest possible social and economic benefit to the country;
- That are widely agreed to have strategic importance for wind and solar PV development;
- Where the environmental and other authorisation processes have been aligned and streamlined based on scoping level pre-assessments and clear development requirements; and
- Where proactive and socialised investment can be made to provide time-efficient infrastructure access.

2.2.5 Integrated Resource Plan-Draft (2018)

The NDP envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates, is socially equitable through expanded access to energy at affordable tariffs and that is environmentally sustainable through reduced pollution. In formulating this vision for the energy sector, the NDP took as point of departure

The Integrated Resource Plan (IRP) 2010–2030, promulgated in March 2011, represents an electricity infrastructure development plan for South Africa based on least-cost supply and demand balance taking into account security of supply and the environment (minimize negative emissions and water usage. Since the promulgated IRP 2010–2030 in 2011 a total 6 422MW under the Renewable Energy Independent

Power Producers Programme (REIPPP) has been procured, with 3 272MW operational and made available to the grid.

At the time of promulgation, it was envisaged that the IRP would be a "living plan" to be revised by the Department of Energy (DoE) frequently. Since the promulgation of the IRP in March 2011 a number of assumptions have changed, including electricity demand projection, Eskom's existing plant performance, as well as new technology costs. The 2018 IRP notes that the Gross Domestic Product (GDP) for the period 2010–2016 was significantly lower than the GDP projections assumed in the promulgated IRP 2010–2030. The expected electricity demand as forecasted in the promulgated IRP 2010–2030 did therefore not materialise and the forecast was updated accordingly to reflect this.

In so doing the 2018 IRP assess the electricity demand for the period 2017-2050. Three demand scenarios were assessed, namely an upper, median and lower forecast based on varying GDP growth rates. The median scenario also took into account the assumed change in the structure of the economy where energy-intensive industries make way for less intensive industries. The lower scenario took into account lower economic growth linked to possible downgrading decisions by rating agencies.

The 2018 IRP also took into account the externality costs associated with Green House Gas (GHG) emissions, specifically the negative externalities-related air pollution caused by pollutants such as nitrogen oxide (NOx), sulphur oxide (SOx), particulate matter (PM) and mercury (Hg). These externality costs reflect the cost to society because of the activities of a third party resulting in social, health, environmental, degradation or other costs.

The scenarios were analysed in three timeframes, namely 2017–2030, 2031–2040 and 2041–2050. The period 2021–2030 is termed a "medium-to-high" period of certainty, with new capacity requirements driven by the decommissioning of old Eskom power plants and marginal demand growth. While demand and technology costs are likely to change, the decommissioning of old plants will definitely result in the requirements for additional capacity.
The period 2031–2040 is termed an "indicative period", as the uncertainty regarding the assumptions begins to increase. The output for this period is relevant to the investment decisions of the 2021–2030 period because it provides information needed to understand various future energy mix paths and how they may be impacted by the decisions made today. The period 2041–2050 is even more uncertain than the period before 2040.

Based on the results of the scenario analyses, the following findings are relevant to the RE sector:

- Committed REIPPP (including the 27 signed projects) and Eskom capacity rollout ending with the last unit of Kusile in 2022 will provide more than sufficient capacity to cover the projected demand and decommissioning of plants up to around 2025;
- The installed capacity and energy mix for scenarios tested for the period up to 2030 does not differ materially. This is driven mainly by the decommissioning of about 12GW of Eskom coal plants;
- Imposing annual build limits on RE will not affect the total cumulative installed capacity and the energy mix for the period up to 2030;

- Imposing carbon budget as a strategy for GHG emission reduction or maintaining the PPD approach used in 2010 will not alter the energy mix by 2030;
- The projected unit cost of electricity by 2030 is similar for all scenarios, except for market-linked gas prices where market-linked increases in gas prices were assumed rather than inflation-based increases[5].
- The scenario without RE annual build limits provides the least-cost option by 2030.

For the period post 2030, the findings indicate:

- The decommissioning of coal plants (total 28GW by 2040 and 35GW by 2050), together with emission constraints imposed, imply coal will contribute less than 30% of the energy supplied by 2040 and less than 20% by 2050.
- Imposing annual build limits on RE will restrict the cumulative renewable installed capacity and the energy mix for this period;
- Adopting no annual build limits on renewables or imposing a more stringent GHG emission reduction strategy implies that no new coal power plants will be built in the future unless affordable cleaner forms of coal to power are available.
- Of key relevance, the assessment found that the scenario without RE annual build limits provides the least-cost option by 2050.

The following conclusions are drawn from the results of the analyses:

- Ministerial Determinations for capacity beyond Bid Window 4 (27 signed projects) issued under the promulgated IRP 2010–2030 must be reviewed and revised in line with the projected system requirements (updated plan);
- The scenario without RE annual build limits provides the least-cost electricity path to 2050;
- Without a policy intervention, all technologies included in the promulgated IRP 2010–2030 where prices have not come down like in the case of PV and wind, cease to be deployed because the least-cost option only contains PV, wind and gas.

The IRP 2018 Report concludes that cased on the findings of the scenarios analysis, the scenario of RE without annual build limits provides the least-cost path up to 2050. The document also notes that a detailed analysis of the appropriate level of penetration of RE in the South African national grid is required in order to better understand the technical risks and mitigations required to ensure security of supply is maintained during the transition to a low-carbon future.

Based on the findings of the study the final proposed plan is a that of a least-cost plan with the retention of annual build limits (1000MW for PV and 1600MW for wind) for the period up to 2030. This provides for smooth roll out of RE, which will help sustain the industry. Table 2.1 outlines the new additional RE capacity envisaged in terms of the 2018 IRP for the period up to 2030. The figure for wind energy is 11 447, making it the largest contributor to renewable energy in South Africa.

[5] Representatives from the RE sector have indicated that this finding does not reflect the latest reductions in production costs associated with renewable energy technologies

Table 2.1: Proposed Updated Plan for the Period Ending 2030

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	33 847	1 860	4 696	2 912	7 958	11 442	600	11 930	499	2600
Installed Capacity Mix (%)	44.6	2.5	6.2	3.8	10.5	15.1	0.9	15.7	0.7	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)
Embedded Generation Capacity (Generation for own use allocation)

(Source: IRP Draft 2018)

2.2.6 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.2.7 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: ***energy***, transport, communication, water and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this

regard clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.2.8 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthen the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPS are SIP 8, 9 and 10.

SIP 8: Green energy in support of the South African economy

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010);
- Support bio-fuel production facilities.

SIP 9: Electricity generation to support socio-economic development

- Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances;
- Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.

SIP 10: Electricity transmission and distribution for all

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
- Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

2.2.9 Astronomy Geographic Advantage Act

The purpose of the Act (Act No 21 of 2007) is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

2.2.10 Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The Bloemsmond site is located within the Upington REDZ, which was formally gazetted in 2018[6]. The area has therefore been identified as suitable for the establishment of renewable energy facilities.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Northern Cape Province Provincial Growth and Development Strategy

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

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

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

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

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

[6] GN 113 and GN114 of 2018

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

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

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

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

2.3.2 Northern Cape Provincial Spatial Development Framework

Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans are to be read and treated as key components of the PSDF. Of these there are a number that are relevant to the proposed STPs. These include:

- Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government;
- Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development;
- Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism;

- Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

Under Section B 14.4, Energy Sector, the NCSDF (2012), notes the total area of high radiation in South Africa amounts to approximately 194 000 km^2 of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km2 of mirror surface in a solar thermal power station were 30.2 MW and only 1% of the area of high radiation were available for solar power generation, then generation potential would equate to approximately 64 GW. A mere 1.25% of the area of high radiation could thus meet projected South African electricity demand in 2025 (80 GW) (NCPSDF, 2012). However the SDF does indicate that this would require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres. The SDF also notes that the implementation of large concentrating solar power (CSP) plants has been proposed as one of the main contributors to greenhouse gas emission reductions in South Africa. In this regard various solar parks and CSP plants have been proposed in the province with Upington being the hub of such developments (NCPSDF, 2012).

Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. The objectives are listed below:

- Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts;
- Enhance the efficiency of Eskom's power station at the Vanderkloof power station;
- In order to reinforce the existing transmission network and to ensure a reliable electricity supply in the Northern Cape, construct a 400 kV transmission power line from Ferrum Substation (near Kathu/Sishen) to Garona Substation (near Groblershoop). There is a national electricity supply shortage and the country is now in a position where it needs to commission additional plants urgently. Consequently, renewable energy projects are a high priority;
- Develop and institute innovative new energy technologies to improve access to reliable, sustainable and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector;
- Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013.

Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector.

- The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible;

- EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above;
- Renewable energy sources such as wind, ***solar*** thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.
- The following key policy principles for renewable energy apply:
  - Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation;
  - Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being;
  - Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements;
  - Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy;
  - The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments;
  - An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved;
  - Public awareness of the benefits and opportunities of renewable energy must be promoted;
  - The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach;
  - Renewable energy must, first, and foremost, be used to address the needs of the province before being exported.

2.2.3 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will 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's 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 NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership 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 indicated as an important element of the Provincial Climate

Change Response Strategy. The MEC also indicated that the NCP was involved in the processing a number of WEF and Solar Energy Facility EIA applications.

2.2.4 ZF Mcgawu District Municipality Integrated Development Plan

The vision set out in the ZFMDM is "Quality support to deliver quality services". The mission is a "Centre of excellence in providing quality basic services through support to local municipalities".

In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region. In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region.

The IDP lists a number of strategic objectives and development objectives. The relevant objectives include:

Strategic objective
To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy. The associated development objective is to:

- Establish a vehicle to ensure all businesses are co-operating (i.e. District LED Forum);
- Create investment opportunities in sectoral development (i.e. investment activities; Entrepreneurial business support programme);
- Enable an environment for business establishment and support initiatives (i.e. Increase the number of businesses; entrepreneurial support)

Strategic objective
To market, develop and co-ordinate tourism in the ZFMDM. The associated development objective is to:

- Promote the Green Kalahari tourism brand in the ZF Mgcawu district

The IDP identifies a number of key challenges. The following are relevant to the proposed development:

- High rate of unemployment;
- Inadequate human capital;
- Youth development;
- Access to health care facilities.

In terms of the Kai Garib Municipality, the priority issues include:

- Lack of Basic Services;
- Lack of proper housing / existing informal settlements/ Lack of Land Ownership;
- Poverty & unemployment, lack of youth development and social issues contributing thereto (Local Economic Development) / Lack of farming land/ commonage;
- Lack of sport and recreational facilities and services;

- Lack of sufficient and proper health services (HIV/AIDS).

The IDP also notes that the ZF Mgcawu District Municipality acknowledges that climate change poses a threat to the environment, its residents, and future development. Actions are required to reduce carbon emissions (mitigation), and prepare for the changes that are projected to take place (adaptation) in the District. ZF Mgcawu District Municipality has therefore prioritised the development of a Climate Change Vulnerability Assessment and Climate Change Response Plan.

2.2.5 Kai! Garib Local Municipality Integrated Development Plan

The vision for the Kai! Garib LM is "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Kai! Garib through good governance, excellent service delivery and sustainable development." The mission is the "Provision of transparent, accountable and sustainable service delivery".

The IDP notes that that the activities of the KGLM are guided by a number of values, of which the following are relevant to the proposed development:

- Transparency in planning and management;
- Proper understanding of the needs of communities;
- The implementation of a development orientated approach to Local Government;
- Building capacity among the staff and Community wherever possible in order to enable them to play an effective role in Local Government.

The IDP is aligned with the National Government identified Key Performance Areas which are:

- KPA 1: Service Delivery and Infrastructure Development;
- KPA 2: Local Economic Development;
- KPA 3: Municipal Financial Viability and Management;
- KPA 4: Institutional Development and Transformation;
- KPA 5: Public Participation and Good Governance.

KPA 2, Local Economic Development, is the most relevance KPA for the proposed development.

A SWOT analysis was undertaken as part of the IDP. The following are of relevance to the proposed development.

Strengths
- Solar energy;
- Potential for private investment;
- Large labour pool available.

Weaknesses
- Lack of formal sector employment opportunities;
- Lack of attractive and vibrant business;
- Lack of financial stability;
- Lack of social facilities;
- High unemployment rate;

- High number of people living in poverty;
- Low disposable household income;
- Lack of proper community centres in neighbourhoods;
- Acceptable level of expertise;
- Lack of economic opportunity.

Opportunities
- Provincial tourism initiatives;
- Small business development.

Threats
- Lack of skills and capacitated labour;
- High rate of unemployment.

The key priority issues identified in the IDP includes poverty, unemployment, lack of youth development and Local Economic Development. Of key relevance the IDP also notes that the KGLM is positive about the contribution of renewable energy, specifically solar, to the local economy and future economic development. In this regard there are already six established Independent Power Producers in the KGLM (Table 2.2) and a there are a further 21 applications in place. The KGLM is also a participant in the ZF Mgcawu Development Forum, an initiative coordinated by the IDC which aims to ensure that integrated development planning and implementation of regional projects take place. This includes the renewable energy and mining plants, together with other industry stakeholders such as agricultural, business and civil society stakeholders.

Table 2.2: Renewable energy projects in the KGLM

IPPs in Kai !Garib Municipality				
Project Name	**Technology**	**Status**	**Size**	**Lead Developer**
Khi Solar One	Solar CSP	Fully operational	50 MW	Abengoa
Aries Solar	Solar PV	Fully operational	9.7 MW	BioTherm Renewable Energy
Neusberg Hydro Electric Project A	Hydro	Fully operational	10 MW	Hydro-SA & Hydro - Tasmania
Dayson's Klip 1	Solar PV	Approvals, planning and finance	75 MW	Scatec Solar
Dayson's Klip 2	Solar PV	Approvals, planning and finance	75 MV	Scatec Solar
Sirius Solar PV Project One	Solar PV	Approvals, planning and finance	75 MW	Scatec Solar

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides a baseline description of the study area with regard to:

- The administrative context;
- Provincial context;
- Overview of district and local municipalities.

3.2 ADMINISTRATIVE CONTEXT

The proposed Bloemsmond SEF site is located within the Kai !Garib Local Municipality (KGLM), which forms part of the larger ZF Mgcawu District Municipality (ZFMDM)[7](Figure 3.1). The main land uses in the area are linked to grape farming and agriculture along the Gariep River and livestock farming away from the river. The town of Keimoes serves as the administrative centre for the KGLM. A number of other solar energy projects proposed in the area.

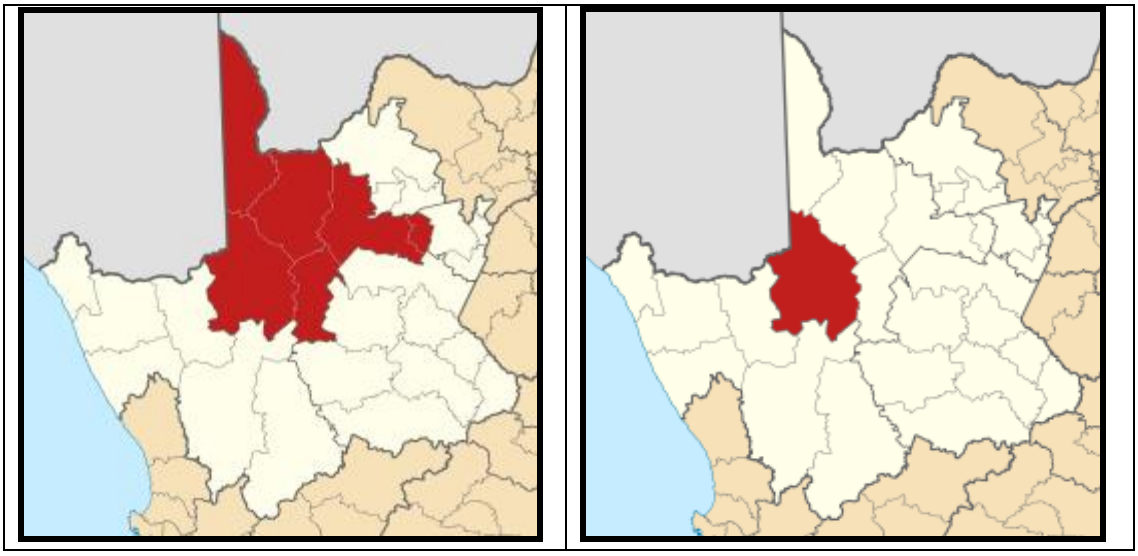

Figure 3.1: Location of ZF Mgcawu District Municipality (left) and Kai! Garib Local Municipality (right) within the Northern Cape Province

[7] ZF Mgcawu District Municipality was previously known as the Siyanda District Municipality

3.3 PROVINCIAL CONTEXT[8]

The proposed SEF facility is located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361 830 $km^{2,}$ and constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Karoo, Namakwa, ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM), and Kgalagadi DM, twenty-six Category B municipalities and five district management areas. The site itself is located in the Kai! Garib LM, which is one of eight local municipalities that fall within the greater ZF Mgcawu District Municipality (DC8).

Population

Despite having the largest surface area, the Northern Cape has the smallest population of 1 193 780 (Community Household Survey, 2016) or 2.2% of the population of South Africa. Of the five districts, Frances Baard has the largest population (32.5%), followed by ZF Mgcawu District Municipality (21.2%), John Taola Gaetsewe (20.3%), Pixley ka Seme (16.4%) and Namakwa (9.7%). The majority of the population in the Northern Cape Province are Black African (48.1%), followed by Coloureds (43.7%) and Whites (7.7%).

In terms of age, 36.5% of the Northern Cape population is between 15 and 34 years old, which is the highest age distribution, followed by 29.2% of those aged 35–64 years, while only 6.6% comprised those aged 65 years and older. Similarly, this pattern is also seen across all districts in the province. The district profile shows that the highest proportions of persons aged 15–34 years were recorded in Pixley Ka Seme, ZF Mgcawu and John Taolo Gaetsewe districts. The figures for these three districts were also above the provincial average of 36.5%. The proportion of persons aged 65 years and older was higher in Namakwa (9.5%) and Frances Baard (8.2%).

Education

Based on the information contained in the NCPSDF the average adult education attainment levels in the Northern Cape are lower than the adult education attainment levels of South Africa as a whole. Approximately 19.7% of the Northern Cape adults have no schooling in comparison to South Africa's 18.1%. The Northern Cape has the second lowest percentage of adult individuals (5.5%) that obtained a tertiary education in South Africa. The LED Strategy for the Northern Cape indicates that Pixley ka Seme has the lowest adult education attainment levels in the Northern Cape with 27.3% of the adult population having no form of schooling, whilst John Taolo Gaetsewe is second with 25.4% having no schooling. The highest number of the adult population with tertiary education (6.4%) is located in Frances Baard.

The Northern Cape also has the smallest portion (11.1%) of highly skilled formal employees in South Africa and Gauteng has the highest (14.3%). Linked to this the Northern Cape has the second largest portion of semi and unskilled formal employees in the country. A lack of skilled people often results in both the public and the private sector being unable to implement planned growth strategies and achieve the desired productivity, service delivery and service quality (NCSDF, 2012).

[8] The information in this section is based on the Northern Cape Provincial Growth and Development Strategy 2004-2014. This document does not include 2011 Census Data. Where possible data from the 2011 Census and 2016 Community Household Survey has been used to update the information.

Economic development

Over the past 8 years there has been little to no variance in the Human Development Index (HDI) figures for the Northern Cape, indicating no increase or decrease in the overall standard of living[9]. This trend is unlikely to change in the foreseeable future, mainly due to the marginal economic base of the poorer areas, and the consolidation of the economic base in the relatively better-off areas. It is important to note that the HDI for the Northern Cape (0.55) is substantially below the South African figure of 0.72. The HDI of 0.55 displays a pattern of semi-development, and there is a definite inequality between the different population groups, with the Whites having a higher development lifestyle than the African or Coloured groups.

The percentage of Northern Cape people living below the poverty line has decreased from 40% in 1995 to 27% in 2011, while the poverty gap has decreased from 11% in 1995 to 8% in 2011 (Figure 3.2). The goal set by the province is to decrease the percentage of people living below the poverty line to 20% by 2015 NCSDF, 2012). The alleviation of poverty is one of the key challenges for economic development. Higher levels of economic growth are a key challenge for poverty eradication. Investment in people is pivotal to the eradication of poverty and inequality. Investment in people is also, to a large extent, about delivering social and economic infrastructure for education, welfare, health, housing, as well as transport and bulk infrastructure.

[9] The Human Development Index (HDI) was developed by the United Nations Development Programme (UNDP) based on the philosophy that the goal of development was to ensure that individuals live long, informed and comfortable lives. The HDI consists of three components: Longevity, which is measured by life expectancy at birth; Educational attainment, which is measured by two education variables, namely adult literacy and combined gross primary, secondary and tertiary enrolment ratio, and; Income, which is measured by gross domestic product (GDP) per capita. Performance in each dimension is expressed as a value between 0 and 1, and the HDI index gives an internationally accepted measure of the wellness (quality of life) of the population of the area under consideration. The closer the HDI is 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.

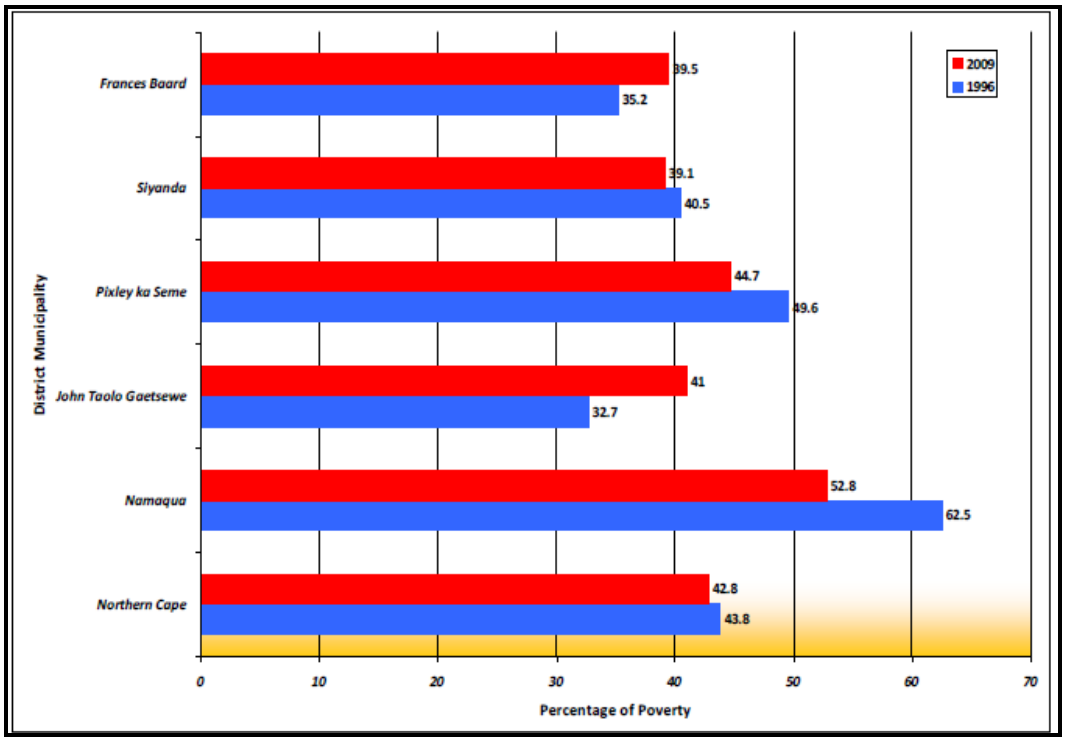

Figure 3.2: Percentage of people living in poverty in the Northern Cape (Source: Global Insight, 2009 as cited in the PGDS, July 2011)[10].

In terms of per capita income, the Northern Cape Province has the third highest per capita income of all nine provinces, however, income distribution is extremely skewed, with a high percentage of the population living in extreme poverty. The measure used in the PGDS document to measure poverty is the percentage of people living below the poverty line or breadline is used[11]. The poverty line indicates a lack of economic resources to meet basic food needs. Figure 3.3 indicates the percentage of household income below the poverty breadline of R800 in the Northern Cape Province, the highest being Karoo at 48% and the lowest being Namakwa at 36%.

[10] Siyanda DM is now called the ZF Mgcawu DM.

[11] 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.

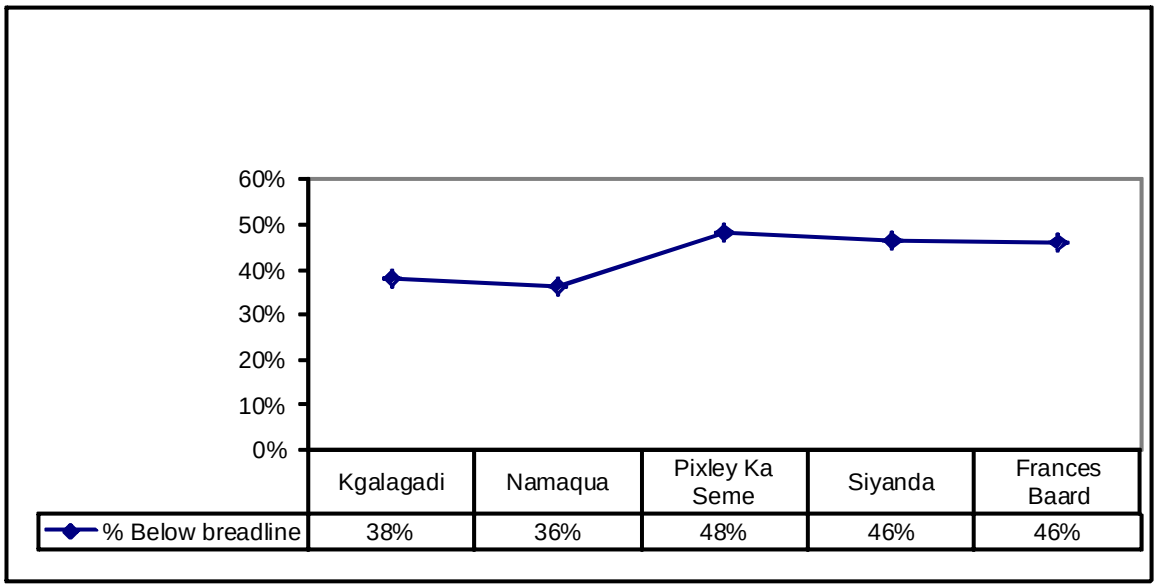

Figure 3.3: Percentage of household income below the poverty breadline by district (*Source: Northern Cape PGDS)*

Economic sectors

The Northern Cape economy has shown significant recovery since 2000/2001 when it had a negative economic growth rate of -1.5% (LED Strategy). The provincial economy reached a peak of 3.7% in 2003/2004 and remained the lowest of all provinces. The Northern Cape is the smallest contributing province to South Africa's economy (only 2% to South Africa GDP per region in 2007).

The mining sector is the largest contributor to the provincial GDP, contributing 28.9% to the GDP in 2002 and 27.6% in 2008. The mining sector is also important at a national level. In this regard the Northern Cape produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% if its manganese.

Agriculture and agri-processing sector is also a key economic sector. Approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme. Approximately 96% of the land is used for stock farming, including beef cattle and sheep or goats, as well as game farming. The agricultural sector contributed 5.8% to the Northern Cape GDP per region in 2007 which was approximately R1.3 billion, and it employs approximately 19.5% of the total formally employed individuals (NCSDF, 2012). The sector is experiencing significant growth in value-added activities, including game-farming. Food production and processing for the local and export market is also growing significantly.

The main agricultural produce of the Northern Cape include:

- High-value horticultural products such as table grapes, sultanas and wine grapes, dates, nuts, cotton, fodder, and cereal crops are grown along the Orange River.
- Wheat, fruit, groudnuts, maize and cotton in the Vaalharts irrigation scheme in the vicinity of Hartswater and Jan Kempdorp.

- Vegetables and cereal crops at the confluence of the Vaal River and the Orange Rivers in the vicinity of Douglas.
- Wool, mohair, karakul, Karoo lamb, ostrich meat and leather, and venison throughout most of the province.

Economic development in the Northern Cape is hampered by the vastness of the area and the remoteness of its communities in rural areas. Development is also hampered by the low education and skills levels in the province. As a result unemployment in the Northern Cape presents a major challenge.

Employment
According to Statistics South Africa Labour (2012) the community and social services sector is the largest employer in the province at 29%, followed by the agricultural sector (16%), wholesale and retail trade (14%), finance (8%) manufacturing (6%) and mining (6%), etc. (Figure 3.4).

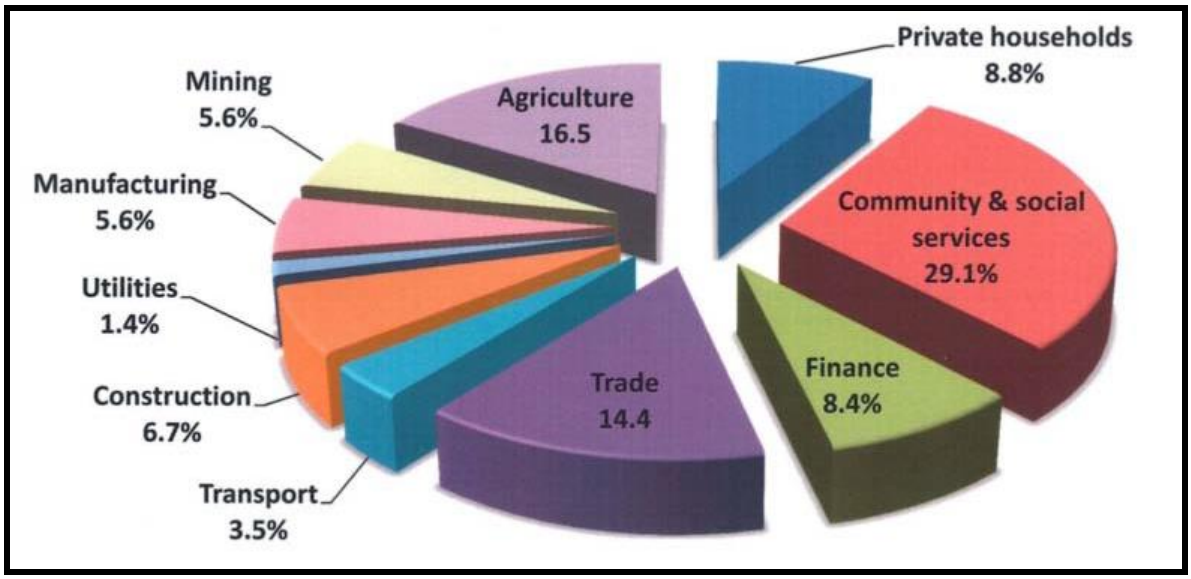

Figure 3.4: Employment by Economic Sector and Industry (Source: Statistics South Africa 2012).

3.4 ZF MGCAWU DISTRICT MUNICIPALITY

The ZF Mgcawu District Municipality (ZFMDM) consists of six Local Municipalities namely, Dawid Kruiper[12]; Kai! Garib; //Khara Hais; Tsantsabane, !Kheis and Kgatelopele, and covers an area of more than 100 000 km^2 (almost 30% of the Northern Cape Province). Of this total, 65% (65 000 km^2) is made up of the Kalahari Desert, Kgalagadi Transfrontier Park and the former Bushman Land. The largest town in the region is Upington, which also functions as the district municipal capital. Following the municipal elections in 2011, Riemvasmaak (Sending and Vredesvallei) were included within the KGLM. The Riemvasmaak Community is located ~ 60 km west of Kakamas. Based on the Household Community Survey data the population of the

[12] Dawid Kruiper LM was established after the August 2016 local elections by merging Mier and //Khara Hais local municipalities.

ZFMDM was 252 692 in 2016 compared to 236 763 in 2011. The DLKM and KGLM are home to ~ 70 % of the ZFMDM population (Table 3.1).

Table 3.1: Population of Local Municipalities within the ZFMDM

Local Municipality	Population	Percentage
Dawid Kruiper	107 161	42.4%
Kai !Garib	68 929	27.3%
Tsantsabane	39 345	15.6%
!Kheis	16 566	7.5%
Kgatelopele	20 691	8.2%

Source: Household Community Survey 2016

The Coloured population group make up the dominant group in the ZFMDM, DKLM and KGLM, followed by Black Africans and Whites. In terms of language, Afrikaans, followed by Setswana and IsiXhosa are the three main languages spoken in the area.

The ZFMDM accounts for ~ 30% of the Northern Cape economy. Agriculture plays a key role in the local economy and is strongly linked to irrigation along the Gariep River (Orange River). The Orange River is perennial with a flow which varies between 50 and 1800 cubic meter per second (cum/s) depending on the season. The flow of the river is largely controlled by the releases of the dams upstream, like the Bloemhof, Gariep and Van der Kloof dams. Agriculture in the ZFMDM is dominated by grape production for table grapes, which is mainly exported to Europe, as well as livestock and game farming.

The Orange River over area delivers a major part is that South Africa's table grape production. More than 90% of Africa's total dried vine fruit arm production is produced in the Northern Cape. The Orange River Wine Cellars Co-op, based in Upington, is the second largest winemaking cooperative in the world and has wine cellars in Groblershoop, Grootdrink, Upington, Keimoes and Kakamas.

Livestock farming occurs mainly on large farms where farming is extensive. The majority of the farms are privately owned. The central parts of the region consist mainly of semi-desert areas and are therefore, with a few exceptions, mainly suitable for extensive livestock farming. In terms of employment, the most important economic sectors are Agriculture, followed by Community, Social and Personal, and Private Households.

Tourism represents one of the most important economic sectors in the Northern Cape as well as within the ZFMDM. In this regard the ZFMDM IDP indicates that tourism is the fastest growing component of the economy. Key tourism assets include the world renowned Kgalagadi Transfrontier Park, Augrabies National Park and Pitskop Nature Reserve near Upington.

Minerals and mining also play an important role in the local economy of the ZFMDM. Key mining activities include copper and zinc of Areachap north of Upington. Various small concentrations of calcite, lead, fluorspar, barite, wolfram and amethyst. Salt is also being mined at two pans, namely Groot Witpan, 95 km northwest of Upington and at Witpan, 115km northwest of Upington. In terms of social well-being the ZFMDM's greatest social challenges are illiteracy, poverty and low education levels.

3.5 KAI! GARIB MUNICIPALITY

3.5.1 Introduction

The proposed facility is located in the KGLM, a category-B municipality[13]. The municipality is approximately 7 445 km² in size (~7.2% of the ZFMDM) and is bordered to the north, south and west by a District Management Area (NCDMA08) and in the east by the //Khara Hais and !Kheis Local Municipalities. In terms of land use, the Kai! Garib Local Municipality is largely rural and agricultural with three urban/semi-urban nodes at Kakamas, the designated administrative centre of the municipality, Keimoes and Kenhardt.

The Orange River (Gariep River) plays a key role in the day to day life of most the inhabitants in the KGLM and is critical to the areas economic well-being. The main towns of Kakamas and Keimoes are situated in the midst of an intensive irrigation farming community stretching from Groblershoop in the east up to Blouputs in the west. Farming includes crops such as vineyards, pecan nut- and citrus plantations. Local areas within the KGLM where intensive irrigation is undertaken include Blouputs, Eksteenskuil, Riemvasmaak and Cannon Island.

The KGLM also has two unique trust communities that in many ways functions differently than other communities. The first is Riemvasmaak which is located ~ 60 km west from Kakamas and falls with Ward 1 of the municipality. The Riemvasmaak community consists of ~ 250 households and were forcefully removed from their land in 1973 and returned in 1994. The Riemvasmaak Community Trust is divided in two sections namely Vredesvallei and Mission.

Of relevance to the proposed development is the second Trust community, the Blocuso Trust Community, which consists of 3 farms, namely, Bloemsmond, Curriescamp and Soverby. These farms are located in Ward 8, ~ 10 km north east of Keimoes. The community of Bloemsmond is located immediately to the south of the site. The farms were handed over to the three families by Queen Victoria in 1886. However, the properties were forcefully resold to white farmers in 1914 and the previous owners became farm workers. The Independent church of Gordonia under the leadership of Ds Saul Damon bought back the farmers between 1914 and 1934. In 2000 the government assisted the 466 families on the three farms to buy the farms from the church. The communities established the Blocuso Trust and used the government subsidies to buy the farms and provide basic services like electricity and clean water. Since the Blocuso Trust was established the government have provided the trust with great assistance in terms of infrastructure projects.

The Municipal Area is divided into 9 wards (Table 3.2). The proposed SEF is located in Ward 8.

[13] A category-B municipality is defined as a municipality that shares executive and legislative authority in its area with a category- C municipality within whose area it falls.

Table 3.2: List of Wards in the KGLM

Ward	Areas
1	Augrabies, Noudonsies, Zeekoeisteek, Blouput Riemvasmaak
2	Cillie, Marchand, Perde-eiland, Omdraai
3	Kakamas Dorp, Alheit, Bloukamp, Truterkamp
4	Kromhout Boerdery, Kakamas Oos (Langverwag), Neus
5	Lennertsville, Koms, Keimoes Dorp, Akasia Park
6	Gardenia, Whalsig, Noodkamp, Vaaldriehoek
7	Lutzburg, Friersdale, Warmsand, Eenduin, Swartbooisberg, Bloemsmond,
8	Eksteenskuil Eilande, Soverby, McTaggerscamp, Curriescamp, Blaauwsekop, Kanoneiland
9	Kenhardt, Southern Farms

(Demarcation Board 2012)

3.5.2 Demographics

Population

As indicated in Table 3.3, the population of the KGLM increased from 65 869 to 68 929 between 2011 and 2016. The increase in the population in the KGLM was linked to an increase in the 15-64 age group. There were decreases in the less than 15 and 65+ age groups. In terms of breakdown, the majority of the population are Coloured, followed by Black African and Whites. The dominant language was Afrikaans, followed by Setswana, and English.

As expected, the number of households in the KGLM increased from 16 703 in 2011 to 20 016 in 2016. The average household size remained the same at 2.9 (Table 3.3). The number of formal dwellings remained similar at around 88.4%.

The dependency ratio in the KGLM decreased from 41.9 in 2011 to 38.3 in 2016. This improvement indicates that there are fewer people who are dependent the economically active 15-64 age group. This represents a positive socio-economic improvement. The dependency ratio in the KGLM is also significantly lower than the ratio for the ZFMDM, which was 46.8 in 2016. The age dependency ratio is the ratio of dependents, people younger than 15 or older than 64, to the working, age population, those ages 15-64.

Household income

Based on the data from the 2016 data, 5.1% of the population of the KGLM had no formal income, 2% earned between 1 and R 4 800, 4% earn between R 4 801 and R 9 600 per annum, 30.7% between R 9 601 and 19 600 per annum and 27.7% between R 19 600 and R 38 200 per annum (Household Community Survey 2016).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household. Based on this measure 69.5% of the households in the KGLM live close to or below the poverty line. In 2011 this figure was 65.3%. The low-income levels reflect the limited formal employment opportunities in the KGLM and the dependence on the agricultural sector. The low income levels are a major concern given that an increasing number of

individuals and households are likely to be dependent on social grants. The low income levels also result in reduced spending in the local economy and less tax and rates revenue for the district and local municipality.

Employment
In terms of employment, the official unemployment rate in the KGLM decreased from 10% in 2011 to 6.7% in 2016 of the economically active population (Table 3.3). No information for youth unemployment was collected in 2016. The figure in 2011 was 34.5%, while the national youth unemployment level in 2019 was 39.6%, one of the highest in the world. Youth unemployment in the KGLM is therefore still likely to be high. This was confirmed by representatives from the KGLM. Also, while unemployment figure appears to be low, they do not reflect the fact that the majority of the employment in the KGLM is seasonal and linked to the agricultural sector.

Education
Education levels in the KGLM improved between 2011 and 2016 with the percentage of the population over 20 years of age with no schooling dropping from 9.0% to 5.6%. The percentage of the population over the age of 20 with matric also increased from 15.5% to 21.5%. Despite this increase the percentage of the population in the KGLM over the age of 20 with matric is still lower than the ZFMDM (29.8%) and the Northern Cape (29.1%). The overall education levels in the KGLM therefor still remain low.

Table 3.3: Overview of key demographic indicators for the ZFMDM and KGLM

	ZFMDM		KGLM	
ASPECT	**2011**	**2016**	**2011**	**2016**
Population	236 763	252 691	65869	68929
% Population <15 years	28.4	26.9	24.4	22.9
% Population 15-64	66.4	68.1	70.5	72.3
% Population 65+	5.1	5.0	5.1	4.8
Households	61097	74090	16703	23 016
Household size (average)	3.5	3.4	2.9	2.9%
Formal Dwellings %	79.4%	81.4%	88.4%	88.6%
Dependency ratio per 100 (15-64)	50.5	46.8	41.9	38.3
Unemployment rate (official) - % of economically active population	19.2	11.3	10.0	6.7
Youth unemployment rate (official) - % of economically active population 15-34	22.7		10.0	
No schooling - % of population 20+	9.5	6.1%	9.0%	5.6%
Matric - % of population 20+	21.7	29.8%	15.5	21.5%

Source: Compiled from StatsSA Census 2011 and 2016 Community Household Survey

3.5.3 Municipal services

As indicated in Table 3.4, the access municipal services as measured in terms of flush toilets, refuse removal and electricity, has improved in the KGLM from 2011 to 2016. Despite the improvement in municipal service the levels in the KGLM remain lower than the levels for the ZFMDM and the Northern Cape Province (with the exception of households with flush toilets).

Table 3.4: Overview of access to basic services in the ZFMDM and KGLM

	ZFMDM		KGLM	
ASPECT	**2011**	**2016**	**2011**	**2016**
% households with access to flush toilet	63.9	74.2	59.6	73.0
% households with weekly municipal refuse removal	70.3	74.2	53.8	64.3
% households with piped water inside dwelling	48.5	Not available	41.0	Not available
% households which uses electricity for lighting	86.6	95.6	87.4	89.6

Source: Compiled from StatsSA Census 2011 and 2016 Community Household Survey

The KGLM IDP also lists challenges facing education, health and policing.

Education and schools

- Travelling distances between communities and schools, especially relating to Secondary and High schools;
- The quality of transport for school children as many of the busses are not roadworthy;
- Availability of good quality sport and recreational facilities at some of the smaller schools;
- Lack of sufficient teachers and classrooms for the number of pupils/ for subject like maths and science;
- De-motivated teachers.

Health

- HIV/AIDS and TB increases;
- High rate of teenage pregnancies;
- Lack of sufficient and qualified staff and limited skills amongst current nurses and nursing sisters to make correct diagnosis and prescribe correct medicine accordingly;
- Lack of sufficient facilities to render a proper health service to all communities in the KGLM;
- Irregular and insufficient service rendered by mobile clinics;
- Lack of necessary health equipment and medication at clinics.

Safety and crime challenges

- Lack of sufficient police vehicles;
- Lack of accommodation for police officials;
- Increase in crime, i.e. family abuse and robberies, related to alcohol and drug abuse
- Need for houses of safety for victims of violence against woman and children, and domestic violence.

3.5.4 Economic overview

The Orange River (Gariep River) plays a key economic role in the KGLM, with most of the economic activities linked to and located adjacent to the river. In addition, the majority of towns and settlements are located within close proximity to and or adjacent to the river. The economy of the area is heavily depended on the Agricultural Sector, both intensive and extensive. However the major roads (N14, R27 and R359) assist in the growth the municipal area experience.

The renewable energy sector is also recognized as a key sector. The IDP notes that new opportunities have opened up for KGLM area since the need to facilitate the generation of sustainable energy was introduced in South Africa by Eskom and the South African government. The IDP notes that there are a number of solar projects proposed in the area and that the economic benefits from these projects are eagerly anticipated.

As indicated above, the KGLM IDP notes that the KGLM is positive about the contribution of renewable energy, specifically solar, to the local economy and future economic development. In this regard there are already six established Independent Power Producers in the KGLM and there are a further 21 applications in place.

In terms of contribution to local GDP the most important economic sector is Agriculture (51.8%), followed by Community and Government Services (15.9%) and Wholesale and Retail Trade (11.3%). The key economic sectors are listed in Figure 3.5.

The Agriculture sector is also a major employer in the Municipality, providing 66.5% of all formal employment. It is also the sector with the largest potential for economic growth. The majority of the agricultural activity is linked to the Orange River, and includes table and wine grapes. Citrus fruit is also becoming more prevalent in the area. There are three wine cellars located in the area in Keimoes, Kakamas and Kanoneiland. Emerging farmers in the area tend to focus more on small stock farming, lucern, cotton, corn, and nuts which are cultivated under irrigation from the Orange River. The IDP identifies a number of constraints facing the agricultural sector, these include, poor quality access roads to and from farms, low farming skills amongst the youth and finances for emerging farmers. The opportunities in the agricultural sector include the expansion of the production of lucern and citrus fruits as well as the possible establishment of ostrich farming. Other sectors that show potential within the sector are agri-tourism.

The tourism sector also plays an important role in the local economy and has been identified a key sector in terms of future growth. The key tourism attractions in the area include the Augrabies Falls, Kokerboom Route, Tierberg Nature Reserve, heritage sites and ancient rock art in Kenhardt, historical routes between islands/ Island Route, water tunnels in Kakamas, Rooibergdam in Kenhardt and Riemvasmaak historical and cultural values. The N14 is also an important route providing access to the Cape in the South and the Kalahari National Park in the north. The tourism accommodation facilities in the area are also of high standard and available in all major towns.

3.6 KHARA HAIS LOCAL MUNICIPALITY

While the town of Upington falls outside of the KGLM, it functions as a key economic center for the area and is the administrative center of the KHLM and the ZFMDM.

Upington is the main town of the //Khara Hais Municipality and has, since its inception, been the hub of activities in the region. In terms of its economic role the town serves as:

- Agricultural hub of the Northern Cape;
- Portal to Namibia and vice versa;
- Frontier to the Kalahari and Kgalagadi Transfrontier Park;
- Portal to the Kalahari's hunting grounds.

In terms of economic indicators, the Municipality enjoys comparative advantages in all of the economic sectors, except mining, compared to the other local municipalities that make up the ZFMDM. The fastest growing sectors in the Municipality are agriculture, electricity and water, and mining sectors. The IDP notes that the current growth occurring in these sectors should be exploited to ensure the creation of new job opportunities for local people.

The IDP makes reference to the SDF and refers to a number of anchor projects approved by Council. The Upington Solar Park proposed by Eskom is located adjacent to the site and is therefore of specific relevance to the proposed STPs. The IDP notes that the establishment of a solar park will place pressure on the municipality in terms of providing the necessary infrastructure.

Agricultural sector

The agricultural sector is largely linked to irrigation along the Orange River (Gariep), specifically table and wine grapes. In this regard the //Khara Hais region accounts for ~ 40% of South Africa's grape exports. Most of Upington's wines are produced by Orange River Wine Cellars (OWC). The company has six depots in the area (all of them located adjacent to the Orange River) at Upington, Kanoneiland, Grootdrink, Kakamas, Keimoes and Groblershoop. The wines from OWC are exported, inter alia, to Europe and the USA. A number of privately owned cellars also exist in the area.

In terms of the agricultural sector there are 7 smaller rural settlements and various farms. Settlements include: Lambrechtsdrift, Karos, Leerkrans, Leseding, Raaswater, Sesbrugge and Klippunt, and Kalksloot. The inhabitants of these settlements are mainly reliant upon agricultural activities for their livelihoods.

Tourism sector

Upington is well situated as a base for exploration of the region, and has an outstanding infrastructure in the form of accommodation. Various areas are classified as nature conservation areas. Spitskop Nature Reserve lies 13 km north of Upington. This nature reserve, of approximately 6 000 hectares, supports gemsbok, zebra, springbok, ostrich, eland, blue wildebeest, as well as smaller game, and can be viewed from a circular route running through the park. Other nature areas within the jurisdiction of //Khara Hais are Gariep Lodge and Uizip. The Kalahari Oranje Museum Complex has the status of a regional- and provincial museum.

Business sector

The central business district of Upington is located along the northern bank of the Orange River (then Gariep River). Due to certain physical limitations, such as the Orange River to the south and south-east and the railway line to the north, the business district has expanded westwards. Smaller suburban shopping centres are found in all residential areas. Both industrial areas on the northern and the south-

western sides of the town (Updustria & Laboria) have railway facilities. Due to the unique spatial manifestation of the municipality, both the first and second economy is mostly located around the CBD and farms. Upington has a well-defined business centre with numerous residential areas. Secondary activities in the study area are mainly light industrial, warehousing, and light engineering works. Main traffic routes connect Upington, the hub of activities in the region, to cities like Kimberley, Johannesburg, Cape Town and Namibia. Upington also serves as the 'Portal' to Namibia and vice versa, the 'Frontier' to the Kalahari and the Kgalagadi Transfrontier Park, the 'Oasis' in the desert', the Agricultural hub of the Northern Cape, and the 'Portal to the Kalahari's hunting ground. Furthermore, two major national parks are situated within a few hours' drive from Upington.

Although there are a large variety of industries, there is a shortage of manufacturing industries. In this regard the KHLM's economy is centred on the trade and retail sector, due to its strong tourism sector, leaving the local economy fairly vulnerable for any significant changes in this industry. The IDP therefore highlights the need for the KHLM to diversify its economy into other sectors. The development of the renewable energy sector will create opportunities to diversify the local economy. The IDP also indicates that the manufacturing sector is one of the lowest performing sectors of the local economy. As a result much in the municipality has to be sourced from outside of the municipal boundaries, resulting in money flowing out of the local economy. Despite the current poor performance of the manufacturing sector there are a number of potential opportunities linked to the agro-processing and other activities.

The IDP identifies a number of potential development constraints and challenges facing the KHLM. Of relevance to the proposed STPs these include a shortage of job opportunities in the area. As a result job seekers are forced to seek employment opportunities outside of the Municipality (e.g. Kimberley), etc. Despite this the employment rate for the Municipality is relatively high, with as much as 75% of people of working age who are actively seeking employment being able to secure a job. However, the majority of the employed population is found in elementary occupations, which require little or no skills. This is also reflected in the low education levels of the local population, with as much as 12% of the population aged 20 years and older having no form of education whatsoever. This, to some extent, constrains the development potential of the Municipality in the development of more advanced industries. The level of employment and type of occupations taken up by the population of the Municipality also directly affects their income levels. The low income levels also impact on buying power and the creation of business opportunities.

In terms of opportunities, Upington Airport has been identified as an alternative or supplement for the O.R Tambo International Airport for cargo traffic, as there is less congestion and quicker airport turnaround times, shorter-to-market timeframes which would enhance product freshness by one day, and improved supply-chain performance, therefore offering greater benefits for cargo airlines and both importers and exporters of goods. The long runway and the strategically advantageous location of the Upington Airport make it ideal to serve the African continent. Due to this, the establishment of an Industrial Development Zone (IDZ) at the airport was proposed to. However, the establishment of an IDZ (Industrial Development Zone) has been replaced by the proposed establishment of a SEZ's (Special Economic Zone). The proposed Upington IDZ (± 400 ha) will be a purpose-built industrial estate linked to the Upington Airport. The IDZ will leverage fixed direct investments in value added and export-oriented manufacturing industries.

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an assessment of the key social issues identified during the study. The identification of key issues was based on:

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

The assessment section is divided into the following sections:

- Assessment of compatibility with relevant policy and planning context ("planning fit";
- Assessment of social issues associated with the construction phase;
- Assessment of social issues associated with the operational phase;
- Assessment of social issues associated with the decommissioning phase.
- Assessment of the "no development" alternative;
- Assessment of cumulative impacts.

The findings of the SIA indicate that the location of the three substations (3, 4 and 5), including the alternatives for substation 5, has no bearing on the nature and significance of the social impacts. Likewise, the nature and significance of the social impacts associated with each of the proposed power lines, including the alternatives identified for B5BC and the Collector to the MTS, are the same. Separate assessments for each substation and the transmission lines alternatives have therefore not been undertaken.

4.2 ASSESMENT OF POLICY AND PLANNING FIT

The findings of the review indicate that renewable, including solar energy, is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is also supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all make reference to renewable energy.

The proposed SEF also supports a number of objectives contained in the NCP Provincial Growth and Development Strategy and the ZFMDM and KGLM IDP, specifically promotion of socio-economic development, SMME's, job creation and private sector investment. The findings of the SIA also indicate that unemployment and poverty levels in the study area are high. In this regard the proposed SEF has the potential to support local economic development and create employment opportunities. The proposed development therefore supports a number of key objectives contained in the

KGLM IDP. The KGLM also identifies solar energy as a growth opportunity within the local economy.

The Bloemsmond site is also located within the Upington REDZ, which was formally gazetted in 2018[14]. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large scale solar farms and the associated grid infrastructure.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

The key social issues associated with the construction phase of the grid infrastructure will be same as the issues associated with the establishment of the proposed SEFs. In this regard the construction activities associated with the establishment of the grid infrastructure are likely to overlap with and be undertaken at the same time as the construction activities associated with the establishment of the proposed Bloemsmond SEFs (Bloemsmond 3, 4 and 5). It is also reasonable to assume that the majority of construction related activities associated with the construction of the grid infrastructure will be undertaken by the same team of construction workers appointed to establish the proposed SEFs. It is therefore not possible to fully separate and distinguish between the social impacts associated with the construction phase of the proposed SEFs and the associated grid infrastructure. In addition, one must also be aware of double counting.

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 local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust and safety impacts of construction related activities and vehicles;
- Impact on productive farmland.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase of for each of the proposed Bloemsmond PV SEFs (3, 4 and 5) will employ in the region of extend over a period of 14-18 months and create approximately 300 employment opportunities during peak construction. The construction of the substations and associated grid connections will employ fewer workers than the establishment of the SEF and associated PV panels. For the purposes of the SIA it is assumed that ~ 20% (60) of the 300 construction workers employed during the establishment of the SEF would also be involved in the establishment of the grid infrastructure. It is also assumed that the construction activities would take place during the same 14-18 month period that the SEF is being constructed.

[14] GN 113 and GN114 of 2018

Members from the local communities in the area, including Bloemsmond, Curriescamp and Soverby, would be in a position to qualify for some of the low skilled and some of the semi-skilled employment opportunities. Communities from the local towns in the area, including Keimoes and Upington, may also benefit. The majority of these employment opportunities are likely to accrue to Historically Disadvantaged (HD) members from the local communities.

Given high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The remainder of the semi-skilled and majority of the skilled employment opportunities are likely to be associated with the contactors appointed to construct the SEF and associated infrastructure. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. In addition, the low education and skills levels in the area may also hamper potential opportunities for local communities. Where feasible the implementation of a training and skills development programme prior to the commencement of construction would also increase the potential to employ local community members. The number of low skilled and semi-skilled positions taken up by members from the local community will depend on the effective implementation of these enhancement measures by the proponent in consultation with the KGLM.

The total wage bill for the construction phase for the individual SEFs was estimated to be in the region of R 50 million (2019 rand value). It is assumed that approximately 20 % of this (R 10 million) would be earned by the construction workers employed for the establishment of the grid infrastructure. A percentage of the wage bill (~R 10 million) will be spent in the local economy which will also create opportunities for local businesses in Keimoes and Upington and the KGLM.

The capital expenditure associated with the construction of grid infrastructure will create opportunities for local companies and the regional and local economy. However, given the technical nature of the project the opportunities for the local economy in the KGLM will be limited. However, opportunities may exist for local contractors and engineering companies in Upington. Implementing the enhancement measures listed below can enhance these opportunities. 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 implementation of the proposed enhancement measures listed below would also enable the establishment of the proposed SEF to support co-operation between the public and private sectors, which would support local economic development in the KGLM. Interviews undertaken LED representatives from the KGLM, Mr Markus and November, as part of SIAs for other renewable energy projects in the KGLM indicated that such development was strongly supported due the limited opportunities in the KGLM area. Unemployment and lack of meaningful skills development were key challenges. The opportunity to create employment was therefore welcomed. However, steps should be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes. This was also supported by Mr McKay, the Director of Planning at the KGLM. However, Mr McKay indicated that the experience from past projects was there tended to be limited employment of local community members. The proponent should therefore commit to employing as many local community members as possible.

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

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

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Local – Regional (2)	Local – Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (40)	Medium (44)
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.		
Residual impacts: Improved pool of skills and experience in the local area.		

Assessment of No Go option

There is no impact, as the current status quo will be maintained. The potential employment and economic benefits associated with the construction of the proposed SEF would however be forgone.

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, the proponent 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 contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;
- Before the construction phase commences the proponent should meet with representatives from the KGLM to establish the existence of a skills database for the area. If such as 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 the proponent 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
- The proponent should liaise with the KGLM with regards the establishment of a database of local companies, specifically BBBEE 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, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The KGLM, in conjunction with the local business sector 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.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. 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 local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly 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), including HIV.

Due to the location of the proposed site no workers will be accommodated on site. The local farmers in the area indicated that due to potential safety and security risks they did not support construction workers being accommodated on the site.

Non-local construction workers are likely to be accommodated in the nearby towns of Keimoes and Upington. The potential risk can be mitigated by a commitment to implement a local employment policy, specifically for the low and semi-skilled employment opportunities associated with the construction phase. The the majority of the low skilled and a reasonable number of the semi-skilled work opportunities can be

taken up by members from the local community. Employing members from the local community to fill the low-skilled job categories will reduce the risk and mitigate the potential impacts on the local communities. Where possible these workers should be sourced from the KGLM. 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 reduced.

While the risks associated with construction workers at a community level will be low, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. This has been borne out from the experiences with other solar energy projects in the Northern Cape Province, for example projects located near Poffadder. However, given the nature of construction projects it is not possible to totally avoid these potential impacts at an individual or family level.

Table 4.2: Assessment of impact of the presence of construction workers in the area 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 (2)	Local (1)
Duration	Short term for community as a whole (2)	Short term for community as a whole (2)
Magnitude	Moderate for the community as a whole (6)	Low for community as a whole (4)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a whole (30)	Low for the community as a whole (21)
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 the current status quo would be maintained. 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 detailed mitigation measures should be outlined in the Environmental Management Plan (EMP) for the Construction Phase. Aspects that should be covered include:

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories;
- The proponent should consider the option of establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local KGLM Councillor for Ward 8, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers;
- The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;
- The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area;
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site;
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. However, as indicated above, due to the location of the site, on-site accommodation for workers may need to be provided.

4.3.3 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed SEF on its own does not constitute a large construction project, the proposed establishment of a number of other SEFs in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can impact on

the local community. The two main areas of concern are associated with the influx of job seekers:

- Impacts on existing social networks and community structures;
- Competition for housing, specifically low cost housing;
- Competition for scarce jobs;
- Increase in incidences of crime. The concern is that these job seekers may not leave town immediately and, in some cases, may stay indefinitely.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.4.2. However, in some instances the potential impact on the community may be greater given that they are unlikely to have accommodation and may decide to stay on in the area. In addition, they will not have a reliable source of income. The risk of crime associated with the influx of job seekers it therefore likely to be greater. Experience from other projects has also shown that the families of job seekers may also accompany individual job seekers or follow them at a later date. In many cases the families of the job seekers that become "economically stranded" and the construction workers that decided to stay in the area, subsequently moved to the area. The influx of job seekers to the area and their families can also place pressure on existing services in the area, specifically low income housing. In addition to the pressure on local services the influx of construction workers and job seekers can also result in competition for scarce employment opportunities. Further secondary impacts included increase in crime levels, especially property crime, as a result of the increased number of unemployed people. These impacts can result in increased tensions and conflicts between local residents and job seekers from outside the area.

The findings of the SIA indicate that potential for economically motivated in-migration and subsequent labour stranding in local towns in the KGLM, such as Keimoes and Kakamas, is likely to be low. This is due the relatively remote locations of these towns. In addition, a number of the job seekers from outside of the area are likely to come from nearby towns in the area, such as Upington. Due to the proximity of these towns the risk of labour stranding is likely to be low. The likelihood to job seekers staying on in towns such as Keimoes and Kakamas is therefore also likely to be low. The risks associated with the influx of job seekers are therefore likely to be low.

Table 4.3: Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
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 the current status quo would be maintained.

Recommended mitigation measures

It is impossible to stop people from coming to the area in search of a job. However, as indicated above, the proponent should ensure that the employment criteria favour local residents in the area. In addition:

- The proponent, in consultation with the KGLM, should investigate the option of establishing a MF to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MF should also include the other proponents of solar energy projects in the area;
- The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities;
- The proponent should implement a policy that no employment will be available at the gate.

4.3.4 Risk to safety, livestock and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famer's and farm workers in the vicinity of the site

threat. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site. The local farmers in the area interviewed indicated that the presence of construction workers on the site would increase the exposure of their farming operations and livestock to the outside world, which, in turn, increased the potential risk of stock theft and crime. This risk would be increased if construction workers are accommodated on the site.

The local farmers did, however, indicate that the potential risks (safety, livestock and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on the site workers during the construction phase. Mitigation measures to address these risks are outlined below.

Table 4.4: Assessment of risk to safety, livestock and damage to farm infrastructure

Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (33)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure 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

Key mitigation measures include:

- The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;

- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;
- Traffic and activities should be strictly contained within designated areas, including for the construction of the transmission line;
- Strict traffic speed limits must be enforced on the farm;
- All farm gates must be closed after passing through;
- Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;
- The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site;
- The proponent 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 the proponent, the contractors and neighbouring landowners. The agreement should also cover loses 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 the proponent must 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 the proponent must ensure that construction workers who are found guilty of stealing livestock 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;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. Local farmers interviewed indicated that grass fires were a concern and posed a threat to their livestock operations. The potential risk of grass fires was heightened by the windy conditions in the area, specifically during the dry, windy winter months from May to October. In terms of potential mitigation measures the option of constructing a firebreak around the perimeter of the site prior to the commencement of the construction phase should be investigated. In addition, a fire-fighting vehicle should be present at all times on the site during the construction phase.

Table 4.5: Assessment of impact of increased risk of grass fires

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	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
The mitigation measures include:

- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;
- The option of establishing a fire-break around the perimeter of the site prior to the commencement of the construction phase should be investigated;
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;
- Smoking on site should be confined to 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 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 should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle;
- Contractor to provide fire-fighting training to selected construction staff;
- No construction staff, with the exception of security staff, to be accommodated on site over night;

- 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.

4.3.6 Impacts associated with 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. Access to the site will be via the same entrance as the Bloemsmond Phases 1 and 2 SEFs off the N14. This will avoid the potential impact on existing vineyards. Mr Willem Snyman (owner of Portion 14 and 5 of 455) and Mr Jaco Strauss (owner of Portion 25 of 455), both indicated that dust from construction vehicles posed a threat to vineyards located adjacent to the access road. Both farmers indicated that the section of access road from the N14 that passes through the vineyards should be surfaced.

Table 4.6: **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	Medium (6)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	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 local farm 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. Dust impacts to vineyards could also impact on future contracts.		
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 heavy vehicles can be effectively mitigated. The mitigation measures include:

- The movement of construction vehicles on the site should be confined to
- The movement of heavy vehicles associated with the construction phase should be timed to avoid times days of the week, such as weekends, when the volume of traffic travelling along the N14 may be higher;
- The section of access road from the N14 that passes through the vineyards should be surfaced;
- Dust suppression measures must be implemented on un-surfaced roads, such as wetting 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.

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase have the potential to result in the disturbance and loss of land available for grazing. The properties that stand to be impacted are:

- Portion 5 of Farm Bloemsmond 455;
- Portion 14 of Farm Bloemsmond 455;
- Remainder of Farm Dyasonsklip 454;
- Remainder of Farm Rooipunt 617;
- Remainder 638 Tungsten Lodge;
- Olyvenhouts Drift Settlement Agricultural Holding, Holding Number 1080.

The impact on farmland associated with the construction phase can 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. Existing internal roads should be used where possible. This this requires careful site planning and management of operations. In the event that new roads are required, these roads should be rehabilitated on the completion of the construction phase.

Table 4.7: 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 substations and power lines will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Low (20)
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
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:

- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
- Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on the completion of the construction phase;
- The footprint associated with the construction related activities (access roads, sub-stations sites, construction camps, workshop etc.) should be minimised;
- All areas disturbed by construction related activities, such as access roads on the site, construction camps 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 included in the EMP;
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- The establishment of renewable energy infrastructure.
- Creation of employment opportunities;
- Benefits associated with the establishment of a Community Trust.

The benefits of the proposed Bloemsmond 3, 4 and 5 SEFs are dependent upon being able to connect to the national grid via the establishment of the grid infrastructure. Likewise the benefits associated with the establishment of a Community Trust are also dependent upon the ability to generate revenue from the sale of renewable energy, which in turn is dependent upon being able to connect to the national grid.

The benefits associated with the establishment of renewable energy infrastructure (including grid infrastructure) and Community Trust have been assessed as part of the SIAs for the proposed Bloemsmond 3, 4 and 5 SEFs. In order to avoid double counting they have therefore not been assessed as part of the SIA for the grid infrastructure. However, it is recognised that grid infrastructure is integral to the overall success of the proposed SEFs.

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

4.4.1 Creation of employment opportunities

The potential employment opportunities associated with grid infrastructure component of the proposed Bloemsmond 3, 4 and 5 SEFs will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits will therefore be limited.

Table 4.8: 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 (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (24)
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.

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.

4.4.2 Visual impact and impact on sense of place

The components associated with the grid infrastructure, specifically the transmission lines (internal and external) will impact on the areas current, relatively undisturbed, rural sense of the place. However, the visual quality of the area has been impacted by an existing Eskom transmission line and the solar tower associated with the Khi Solar 1 CSP and associated reflective solar mirrors to the east of the site. The potential impacts on the areas sense of place are therefore likely to be low for both the substations and the proposed transmission lines (internal and external). In terms of the Collector MTS, Alternative B, which runs southwards along the eastern boundary of Portion 14 of Farm Bloemsmond 455, and then follows the alignment of the Eskom Aries-Upington 400kV servitude, is likely to have a lower impact on the area sense of place given that it is located adjacent to an existing line.

However, the overall social impacts associated with Alternatives A and B are similar and are rated as Low Negative. The final decision regarding the preferred alternative should be informed by the findings of the Visual Impact Assessment (VIA).

Table 4.9: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed grid infrastructure and the potential impact on the areas rural sense of place.		
	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, solar facility can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: 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 also be implemented.

4.4.3 Potential impacts on tourism

The tourism sector is regarded as an important economic sector in the Northern Cape Province (NCP). The tourism potential of the area is linked to the areas natural resources, including the relatively undisturbed scenery and landscape. However, there are no tourist related activities in the vicinity of the site that would be impacted by the proposed development. The visual exposure from the N14 is also likely to be limited. The visual quality of the area has also been impacted by an existing Eskom transmission line and the solar tower and reflective panels associated with the Khi Solar 1 CSP to the east of the site. The impact of the proposed grid infrastructure associated with the proposed SEFs on the tourism potential of the area and the broader KGLM and NCP is therefore likely to be low.

Table 4.10: Potential impact on tourism

Nature: Potential impact on local tourism		
	Without Mitigation	**With Enhancement / Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: The proposed grid infrastructure associated with the Bloemsmond SEFs forms part of a number of SEFs proposed in the area. Given that the site is located in the Upington REDZ the cumulative impacts are not rated significant.		
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 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. Given the small number of people employed during the operational phase the social impacts at a community level associated with decommissioning will be limited. In addition, potential impacts associated with the decommissioning phase can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low Negative.

Table 4.11: Social impacts associated with decommissioning

Nature: Social impacts associated with retrenchment including loss of jobs, and source of income		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (2)	Local and regional (1)
Duration	Medium Term (2)	Very Short Term (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Low (24)	Low (16)
Status	Negative	Negative
Reversibility	Yes, assumes retrenchment packages are paid to all affected employees	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: See below		
Cumulative impacts: Loss of jobs and associated loss of income etc. can impact on the local economy and other businesses. However, decommissioning can also create short term, temporary employment opportunities associated with dismantling etc.		
Residual impacts: See cumulative impacts		

Recommended mitigation measures

The following mitigation measures are recommended:

- The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.

4.6 CUMULATIVE IMPACT ON SENSE OF PLACE

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 SEFs and the associated grid infrastructure and is also likely to be the case in South Africa. The key concerns in terms of cumulative impacts are 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 identifies by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms (SEFs and grid infrastructure) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more wind farms (SEFs and grid infrastructure) along a single journey, e.g. road or walking trail).
- The visual compatibility of different wind farms (SEFs and grid infrastructure) 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 (SEF and grid infrastructure) at a time, but if each successive stretch of the road is dominated by views of a wind farm (SEF and grid infrastructure), 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 SEFs and grid infrastructure.

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 impacts on landscapes are also likely to apply to SEFs and grid infrastructure.

As indicated above, the potential impact of the proposed grid infrastructure associated with the proposed SEFs on the areas sense of place is likely to be low. As indicted in Figure 4.1, there are a number of other SEFs located and proposed in the vicinity of the site. The potential for cumulative impacts associated with combined visibility (whether two or more solar facilities and the associated grid infrastructure will be visible from one location) and sequential visibility (e.g. the effect of seeing two or more solar facilities along a single journey, e.g. road or walking trail) does therefore exist. However, the site is located within the Upington Solar REDZ. The area has therefore been identified as being suitable for the establishment of large scale solar energy facilities and the associated grid infrastructure.

However, the potential impact of solar facilities and the associated grid infrastructure on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of solar plant applications. With regard to the area, a number of SEFs have been proposed in the NCP. The Northern Cape Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications.

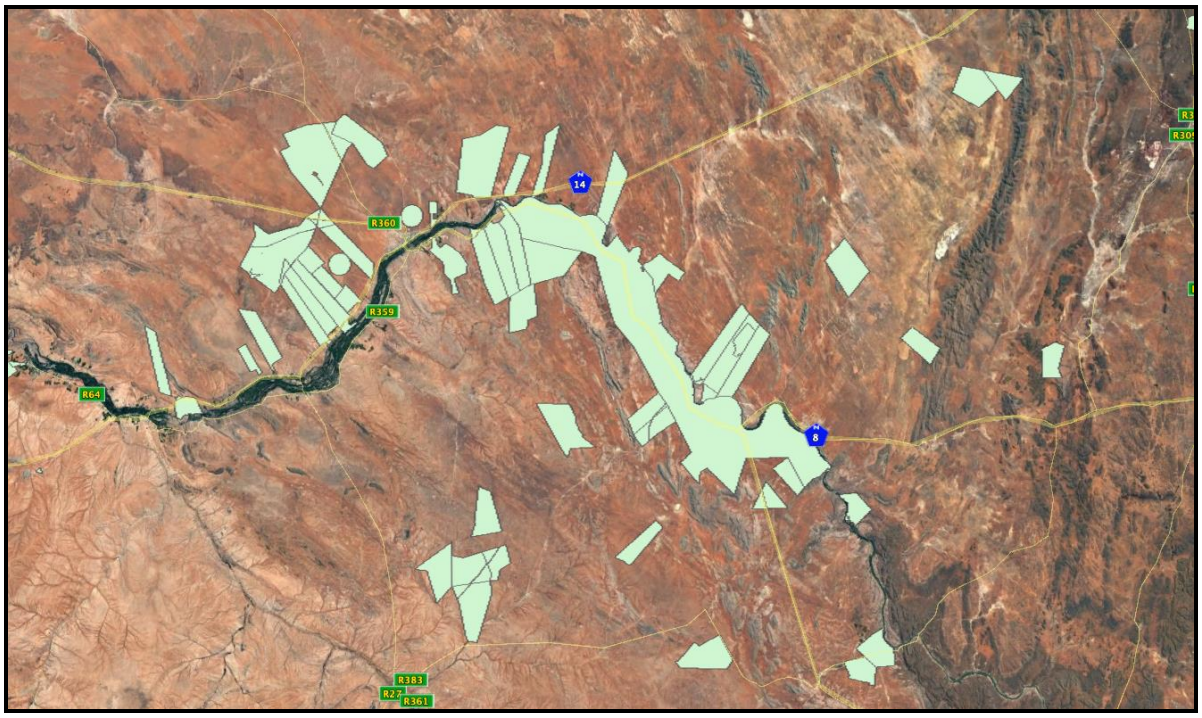

Figure 4.1: Location of renewable energy projects in the vicinity of the site

Table 4.12: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one SEF and the associated grid infrastructure 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	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	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 recommendations of the VIA should be implemented.

4.7 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment renewable energy facilities, including the associated grid infrastructure, on local services in nearby towns, such as Keimoes and Upington, specifically services such as medical, education and accommodation. The significance of this impact with mitigation was rated as **Low Negative**.

4.8 CUMULATIVE IMPACT ON LOCAL ECONOMY

The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment renewable energy facilities, including the associated grid infrastructure, on the local economy. The significance of this impact with enhancement was rated as **High Positive**.

4.9 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 is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost.

However, at a provincial and national level, it should be noted that the proposed SEF development proposal is not unique. In that regard, a significant number of other renewable energy developments are currently proposed in the NCP and other parts of South Africa. Foregoing the proposed SEF development would therefore not necessarily compromise the development of renewable energy facilities in the NCP and or South Africa. However, the socio-economic benefits for local communities in the KGLM would be forfeited.

Table 4.13: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy		
	Without Mitigation	**With Mitigation[15]**
Extent	Local-International (4)	Local-International (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	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.

[15] Assumes establishment of a Community Trust

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 facility.

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

5.2 SUMMARY OF KEY FINDINGS

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

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

The findings of the SIA indicate that the location of the three substations (3, 4 and 5), including the alternatives for substation 5, has no bearing on the nature and significance of the social impacts. Likewise, the nature and significance of the social impacts associated with each of the proposed power lines, including the alternatives identified for B5BC and the Collector to the MTS, are the same. Separate assessments for each substation and the transmission lines alternatives have therefore not been undertaken.

5.2.1 Policy and planning issues

The development of renewable energy is strongly supported at a national, provincial and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all make reference to renewable energy. The proposed SEFs and associated grid infrastructure also support a number of objectives contained in the NCP Provincial Growth and Development Strategy and the ZFMDM and KGLM IDP, specifically promotion of socio-economic development, SMME's, job creation and private sector investment. The KGLM also identifies solar energy as a growth opportunity within the local economy.

The Bloemsmond site is also located within the Upington REDZ, which was formally gazetted in 2018[16]. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large scale solar farms and the associated grid infrastructure.

5.2.2 Construction phase impacts

The key social issues associated with the construction phase of the grid infrastructure will be same as the issues associated with the establishment of the proposed SEFs. In this regard the construction activities associated with the establishment of the grid infrastructure are likely to overlap with and be undertaken at the same time as the construction activities associated with the establishment of the proposed Bloemsmond SEFs (Bloemsmond 3, 4 and 5). It is also reasonable to assume that the majority of construction related activities associated with the construction of the grid infrastructure will be undertaken by the same team of construction workers appointed to establish the proposed SEFs. It is therefore not possible to fully separate and distinguish between the social impacts associated with the construction phase of the proposed SEFs and the associated grid infrastructure. In addition, one must also be aware of double counting.

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.

For the purposes of the SIA it is assumed that ~ 20% (60) of the 300 construction workers employed during the establishment of the SEF would also be involved in the establishment of the grid infrastructure. It is also assumed that the construction activities would take place during the same 14-18 month period that the SEF is being constructed.

Members from the local communities in the area, including Bloemsmond, Curriescamp and Soverby, would be in a position to qualify for some of the low skilled and semi-skilled employment opportunities. The majority of these employment opportunities are likely to accrue to Historically Disadvantaged (HD) members from these local communities. Communities from the local towns in the area, including Keimoes and Upington and other towns in the KGLM, may also benefit.

Given high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. In addition, the low education and skills levels in the area may also hamper potential opportunities for local communities. Where feasible the implementation of a training and skills development programme prior to the commencement of construction would increase the potential to employ local community members.

The total wage bill for the construction phase for the individual SEFs was estimated to be in the region of R 50 million (2019 rand value). It is assumes that approximately 20 % of this (R 10 million) would be earned by the construction workers employed for the

[16] GN 113 and GN114 of 2018

establishment of the grid infrastructure. A percentage of the wage bill (~R 10 million) will be spent in the local economy which will also create opportunities for local businesses in Keimoes and Upington and the KGLM.

The capital expenditure associated with the construction of grid infrastructure will create opportunities for local companies and the regional and local economy. However, given the technical nature of the project the opportunities for the local economy in the KGLM will be limited. However, opportunities may exist for local contractors and engineering companies in Upington. 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.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust and safety impacts of construction related activities and vehicles;
- Impact on productive farmland.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation were **Low Negative**. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative for community as a whole)	Low (Negative for community as a whole)
Influx of job seekers	Low	Low
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

5.2.3 Operational phase impacts

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- The establishment of renewable energy infrastructure.
- Creation of employment opportunities;
- Benefits associated with the establishment of a Community Trust.

The benefits of the proposed Bloemsmond 3, 4 and 5 SEFs are dependent upon being able to connect to the national grid via the establishment of the grid infrastructure. Likewise the benefits associated with the establishment of a Community Trust are also dependent upon the ability generate revenue from the sale of renewable energy, which in turn is dependent upon being able to connect to the national grid. The benefits associated with the establishment of renewable energy infrastructure (including grid infrastructure) and Community Trust have been assessed as part of the SIAs for the proposed Bloemsmond 3, 4 and 5 SEFs. In order to avoid double counting they have not been assessed as part of the SIA for the grid infrastructure. However, it is recognised that grid infrastructure is integral to the overall success of the proposed SEFs.

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

The significance of the potential negative impacts with mitigation was assessed to be of **Low Negative** significance. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. 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/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Low (Positive)	Low (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place
There are a number of other SEFs located and proposed in the vicinity of the site. The potential for cumulative impacts associated with combined visibility (whether two or more solar facilities and the associated grid infrastructure will be visible from one location) and sequential visibility (e.g. the effect of seeing two or more solar facilities along a single journey, e.g. road or walking trail) does therefore exist. However, the site is located within the Upington Solar REDZ. The area has therefore been identified

as being suitable for the establishment of large scale solar energy facilities and the associated grid infrastructure.

However, the potential impact of solar facilities and the associated grid infrastructure on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of solar plant applications. With regard to the area, a number of SEFs have been proposed in the NCP. The Northern Cape Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications.

Cumulative impact on local services and accommodation
The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment renewable energy facilities, including the associated grid infrastructure, on local services in nearby towns, such as Keimoes and Upington, specifically services such as medical, education and accommodation. The significance of this impact with mitigation was rated as **Low Negative**.

Cumulative impact on local economy
The SIAs for the proposed Bloemsmond SEFs assessed the potential cumulative impact of the establishment renewable energy facilities, including the associated grid infrastructure, on the local economy. The significance of this impact with enhancement was rated as **High Positive**.

5.2.5 Decommissioning phase

Given the relatively small number of people employed during the operational phase the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, 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**.

5.2.6 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producer of carbon emissions in the world, this would represent a High negative social cost. The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction and operational phase) associated with the proposed SEFs, and the benefits associated with the establishment of a Community Trust. This also represents a negative social cost.

However, at a provincial and national level, it should be noted that the SEF development proposal is not unique. In that regard, a significant number of renewable energy development, including SEFs, are currently proposed in the NCP and South Africa. Foregoing the proposed SEF development would therefore not necessarily compromise the development of renewable energy facilities in the NCP or South Africa. However, the socio-economic benefits the local communities in KGLM would be forfeited.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The development of the grid infrastructure represents an integral part of the proposed Bloemsmond SEFs (3, 4 and 5). The findings of the SIAs for these SEFs indicate that they will create create employment and business opportunities for locals during both the construction and operational phase of the project. The benefits of the proposed Bloemsmond 3, 4 and 5 SEFs are dependent upon being able to connect to the national grid via the establishment of the grid infrastructure. The establishment of the proposed SEFs was supported by the findings of the relevant SIAs.

The findings of the SIA for the grid infrastructure indicate that the significance of the potential negative impacts for both the construction and operational phase **Low Negative** with mitigation. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of the grid infrastructure for the Bloemsmond 3, 4 and 5 SEFs is therefore supported by the findings of the SIA. The site is also located within the Upington Solar REDZ. The area has therefore been identified as being suitable for the establishment of large scale solar energy facilities and the associated grid infrastructure.

The findings of the SIA also indicate that the location of the three substations (3, 4 and 5), including the alternatives for substation 5, has no bearing on the nature and significance of the social impacts. Likewise, the nature and significance of the social impacts associated with each of the proposed power lines, including the alternatives identified for B5BC and the Collector to the MTS, are the same, namely **Low Negative** with mitigation. The decision regarding the preferred alternative for B5BC and the Collector to the MTS should be informed by the findings of the VIA.

ANNEXURE A

INTERVIEWS

- Mr Synman, landowner, 20/05/2019;
- Mr Mike Clarke, Head of Engineering, Kai !Garib Local Municipality, 20/5/2019;
- Mr Jaco Strauss, adjacent landowner, 20/05/2019;
- Mr MacKay, Director of Planning, Kai !Garib Local Municipality, 21/05/2019;
- Councilor Fillies, Ward 8, 21/05/20-19 (telephonic).

The following representatives from the Kai !Garib Local Municipality were interviewed in 2016 as part of an SIA for a SEF located near Kenhardt:

- Markus, Mr (26/08/16). Kai !Garib Local Municipality – Keimoes LED office.
- November, Mr Alcord (26/08/16). Kai !Garib Local Municipality – Keimoes LED office.

REFERENCES

- 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);
- The National Development Plan (2011);
- Northern Cape Provincial Growth and Development Strategy (2004-2014);
- Northern Cape Climate Change Response Strategy (in progress);
- Northern Cape Spatial Development Framework (2012);
- Kai! Garib Local Municipality Integrated Development Plan (IDP) (2017-2022);
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS;
- Independent Power Producers Procurement Programme (IPPPP): An Overview (2017), Department of Energy, National Treasury and DBSA;
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.

ANNEXURE B: ASSESSMENT METHODOLOGY

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 reso*urces.
- 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: CV

Tony Barbour
ENVIRONMENTAL CONSULTING AND RESEARCH

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(E-Mail) tbarbour@telkomsa.net

Tony Barbour's experience as an environmental consultant includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

- BSc (Geology and Economics) Rhodes (1984);
- B Economics (Honours) Rhodes (1985);
- MSc (Environmental Science), University of Cape Town (1992)

EMPLOYMENT RECORD

- Independent Consultant: November 2004 – current;
- University of Cape Town: August 1996-October 2004**:** Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- Private sector: 1991-August 2000: 1991-1996**:** Ninham Shand Consulting (Now Aurecon, Cape Town). Senior Environmental Scientist; 1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Cape Town.

LECTURING

- University of Cape Town: Resource Economics; SEA and EIA (1991-2004);
- University of Cape Town: Social Impact Assessment (2004-current);
- Cape Technikon: Resource Economics and Waste Management (1994-1998);
- Peninsula Technikon: Resource Economics and Waste Management (1996-1998).

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 200 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. All of the SIAs include interacting with and liaising with affected communities. In addition he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

Tony was also the project manager for a study commissioned in 2005 by the then South African Department of Water Affairs and Forestry for the development of a Social Assessment and Development Framework. The aim of the framework was to enable the Department of Water Affairs and Forestry to identify, assess and manage social impacts associated with large infrastructure projects, such as dams. The study also included the development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation.

Countries with work experience include South Africa, Namibia, Angola, Botswana, Zambia, Lesotho, Swaziland, Ghana, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan and Sudan.

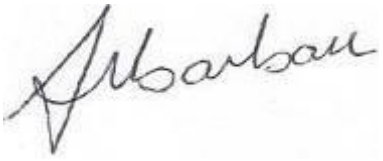
ANNEXURE D: DECLARATION OF INDEPENDENCE

The specialist declaration of independence in terms of the Regulations_

I, ~~Tony Barbour~~ , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct;
and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

29 June 2019

Date: