SOCIAL IMPACT ASSESSMENT

GRID CONNECTION INFRASTRUCTURE

FOR

PROPOSED GEEL KOP PV FACILITIES

NORTHERN CAPE PROVINCE

APRIL 2020

Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

CapeEAPrac was appointed to manage the Basic Assessment (BA) process for the proposed Grid Infrastructure to link the seven proposed PV facilities located on RE Geel Kop Farm No 456 to the national grid via the Eskom Upington MTS. The site is located in the Northern Cape Province, approximately 30 km south-west of Upington and approximately 8 km north-east of Keimoes. The project site is situated within the Kai !Garib Local Municipality (KGLM), which is located within the ZF Mgcawu District Municipality (ZFMDM). The study are falls within the Upington Renewable Energy Development Zone (REDZ).

Tony Barbour Environmental Consulting was appointed by Cape EAPrac 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 Geelkop SEFs transmission line.

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 on-site substations associated with each of the seven PVs will have no bearing on the nature and significance of the social impacts associated with the transmission line. The substations have therefore not been assessed.

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 study area is also located within the Upington REDZ, which was formally gazetted in 2018[1]. The area has therefore been identified as suitable for the

[1] GN 113 and GN114 of 2018

establishment of renewable energy facilities and the associated grid connection infrastructure.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 12 months and create in the region of 130 employment opportunities. The total wage bill will be in the region of R 20 million (2020 Rand values). Most of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to local residents in the area, specifically residents from local settlements, such as Brugge, Klippunt, Dyasons Klip, Oranjevallei, Louisvale, Kanoneiland, Bloemsmond, Curriescamp and Soverby,. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities. A percentage of the wage bill 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

It is important to recognise that the benefits associated with renewable energy projects, such as the seven proposed PVs located on RE Geel Kop Farm No 456 are dependent upon being able to connect to the national grid.

The key social issues associated with the operational phase include:

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

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. The potential negative impacts can therefore be effectively mitigated.

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
Establishment of infrastructure to support renewable energy	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Low (Positive)
Benefits associated with Community Trust	Medium (Positive)	High (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 Solar 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. 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 significance of this impact with mitigation was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **High Positive**.

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.

CONCLUSIONS AND RECOMMENDATIONS

The development of the grid connection infrastructure is integral to the development and success of the renewable energy programme. The benefits associated with the seven proposed SEFs located on Geel Kop Farm are therefore dependent upon being able to connect to the national grid via the establishment of the grid connection infrastructure.

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 are **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of the grid connection infrastructure linking the seven proposed PVs located on RE Geel Kop Farm No 456 to the ESKOM Upington MTS is therefore supported by the findings of the SIA. The grid connection infrastructure is also located within the Upington Solar 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.

TABLE OF CONTENTS

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Section 1.6, p4, Annexure C, p84
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.7, p4, Annexure D, p85
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, p1, Section 1.2, p2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, p2, Section 3, p23
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4, p48
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A for SIA
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, p2, Annexure B, p82
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4, p48, Section 5, p76
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A for SIA
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5, p3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, p48, Section 5, p76
(k) any mitigation measures for inclusion in the EMPr;	Section 4, p48
(l) any conditions for inclusion in the environmental authorisation;	Section 4, p48, Section 5, p76
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 5.3, p80
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annexure A, lists key stakeholders interviewed
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

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

Cape EAPrac was appointed to manage the Basic Assessment (BA) process for the proposed 132 kV powerline to link the seven proposed PV facilities located on RE Geel Kop Farm No 456 to the national grid via the Eskom Upington MTS. The site is located in the Northern Cape Province, approximately 30 km south-west of Upington and approximately 8 km north-east of Keimoes. The project site is situated within the Kai !Garib Local Municipality (KGLM), which is located within the ZF Mgcawu District Municipality (ZFMDM). The study are falls within the Upington Renewable Energy Development Zone (REDZ).

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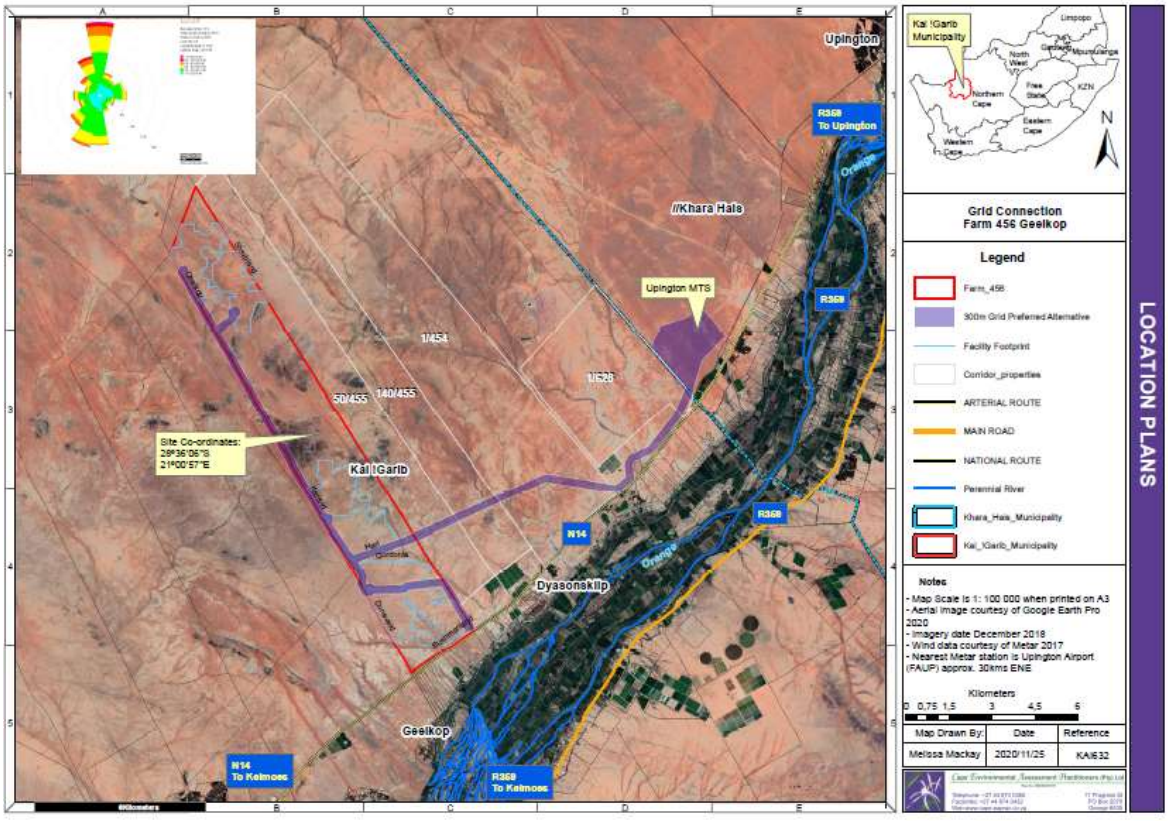

Figure 1.1: Grid Connection Location

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 transmission line consists of a 132 kV powerline connecting the onsite sub-stations to the Upington MTS (400/132 kV), via the 132kV Geelkop Collector Substation. As indicated in Figure 1.1, the transmission line runs in a west east direction from the eastern boundary of RE Geel Kop Farm No 456 to the Eskom Upington MTS, which is located ~ 16 km to the east.

The line is located between 2.5 and 3 km north of the N14 and crosses the following properties:

- Bloemsmond Farm;
- Dyason's Klip (454/RE);
- Mc Taggart's Camp 453;
- Remaining Extent of Portion 35 of the farm 453Mctaggarts Camp;
- Remaining Extent (Portion 0) of the Farm 636 and
- Oliewenhoutdrift

The Upington MTS is located on Oliewenhoutdrift.

In terms of existing infrastructure in the area, an existing 132 kV line linking Eskom's Omnia substation and the Upington MTS, is also located in the area to the north of the N14. A portion of the line runs across the a section of RE Geel Kop Farm No 456, approximately 200 m north of the N14. A Telkom line is also located immediately to the north of the N14. A number of existing solar energy facilities in the area also feed into the Upington MTS. These include Abengoa's Khi One CSP facility,Scatec's Sirius and Dyasonsklip 1 and Dyasonsklip 2 PV facilities, which are located <8 km to the east of the site. The relevant substations and associated transmission lines are located >2.5 km north of the N14.

Alternatives

A number of alternatives have were as part of this environmental process. These include:
These alternatives are discussed in the sections that follow.

Powerline corridor alignments between the facility substations / switching stations and the collector switching station.

There are 4 assessment corridors that will connect each of the facility substations / switching stations to one another and/or to the collector switching station. The final

configuration of the overhead powerlines within each of the corridors described below will depend on the final number of projects that proceed to the construction phase. Notwithstanding the final configuration, all powerline infrastructure will fall within the corridors described below[2]

Powerline corridor between GK Solar PV switching station and Shrubland PV switching station

This will include a single circuit 33kV or 132kV overhead powerline (OHL) as shown below. This line will connect the GK Solar PV switching station to the Shrubland PV switching station (the footprint of each of these switching stations will be 100m x 50m).

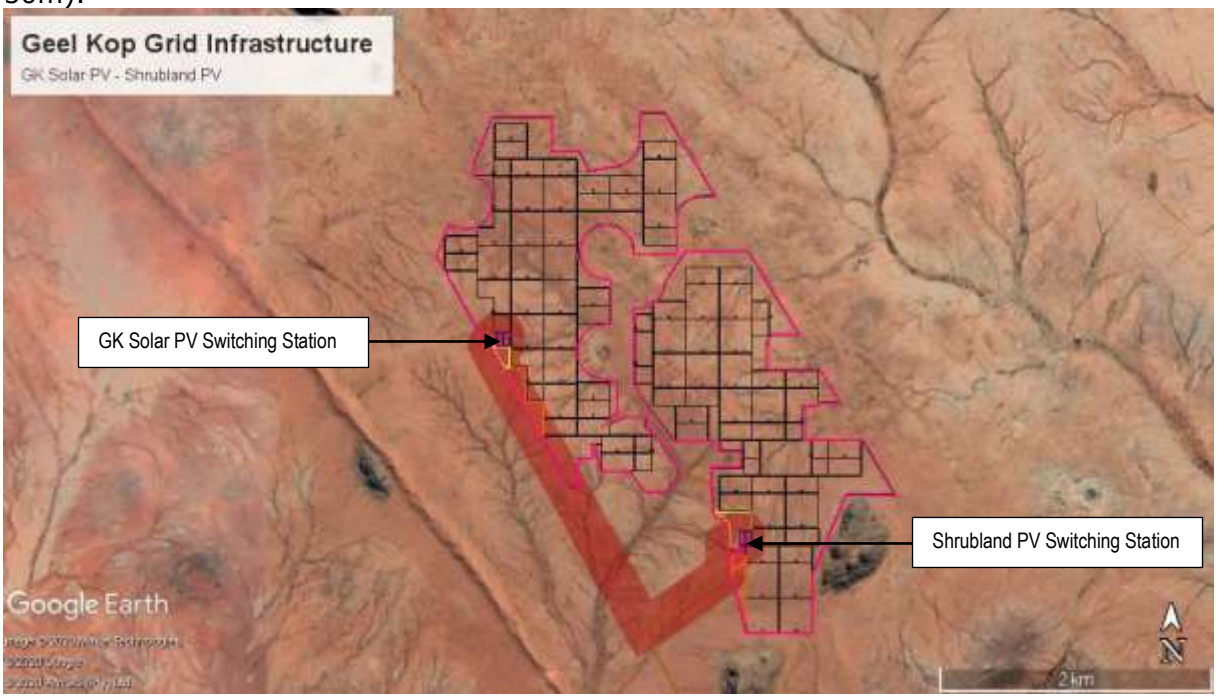

Figure 1: Powerline corridor between GK Solar PV switching station and Shrubland PV switching station

Powerline corridor between Shrubland PV switching station and Karroid PV switching station/ Hari PV facility substation

This will include either a single or double circuit 33kV or 132kV OHL within the corridor shown in the image below. This line will connect the Shrubland PV switching station to the Karroid PV switching station/Hari PV facility substation (the footprint of the Shrubland switching station will be 100m x 50m and the Karroid PV switching station will be 75m x 75m).

[2] All corridors have been considered and assessed as 300m wide corridors.

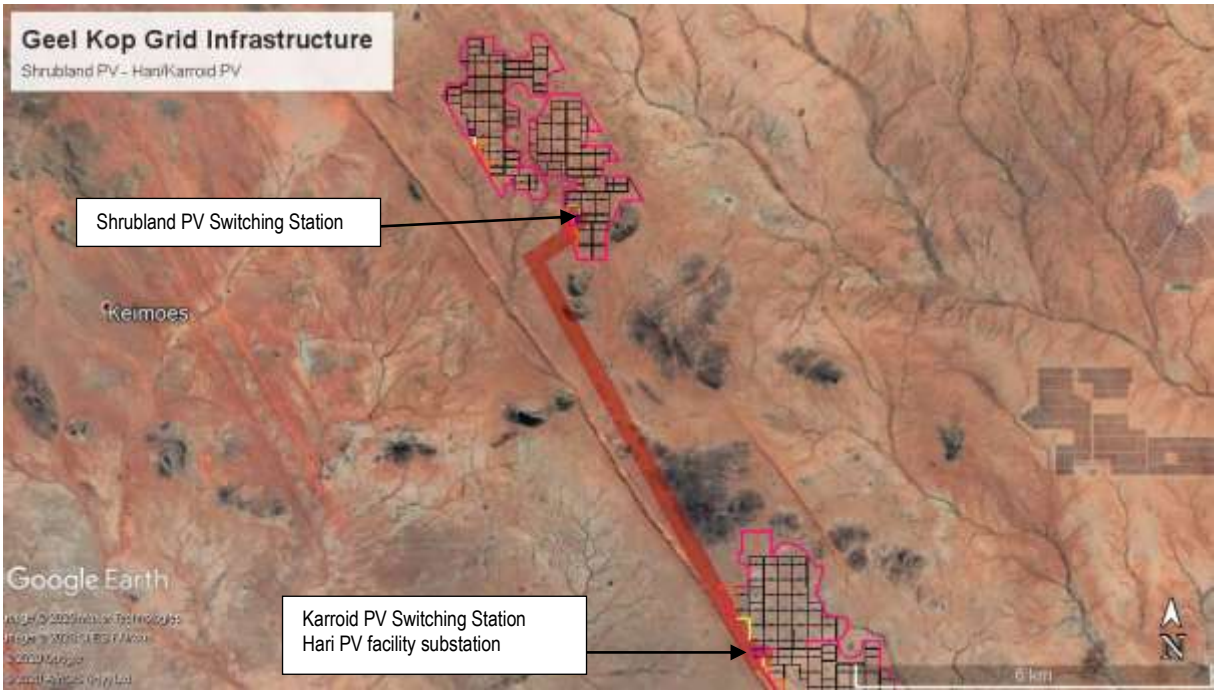

Figure 2: Powerline corridor between Shrubland PV switching station and Karroid PV switching station/ Hari PV facility substation.

Powerline corridor between Karroid PV switching station/ Hari PV facility substation and the Geel Kop collector switching station.

This will include a double circuit 33kV or 132kV power line linking the Karroid PV switching station / Hari PV facility substation and Geel Kop collector switching station as shown in the image below. The footprint of both the Geel Kop collector switching station will be approximately 150m x 75m.

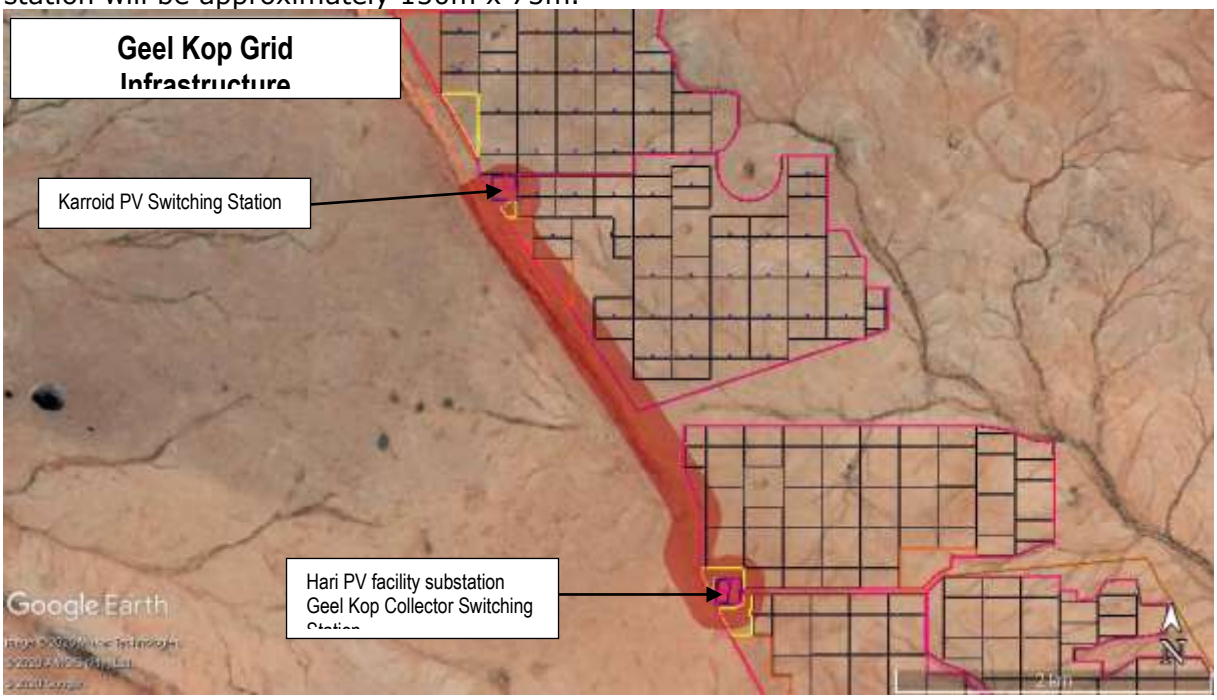

Figure 3: Powerline corridor between Karroid PV / Hari PV switching station and Gordonia Solar PV/ Duneveld PV collector substation/ switching station.

Power line corridor between Geel Kop collector switching station and Bushmanland PV facility substation/ collector switching station

It must be noted that the Geel Kop collector switching station is the preferred collector as discussed in section 2.7.2 below.

This corridor will include a double circuit 33kV or 132kV powerline connecting Geel Kop collector switching station and Bushmanland PV facility substation/ collector switching station as shown in the image below. The Bushmanland collector switching station would have a footprint 150m x 75m.[3]

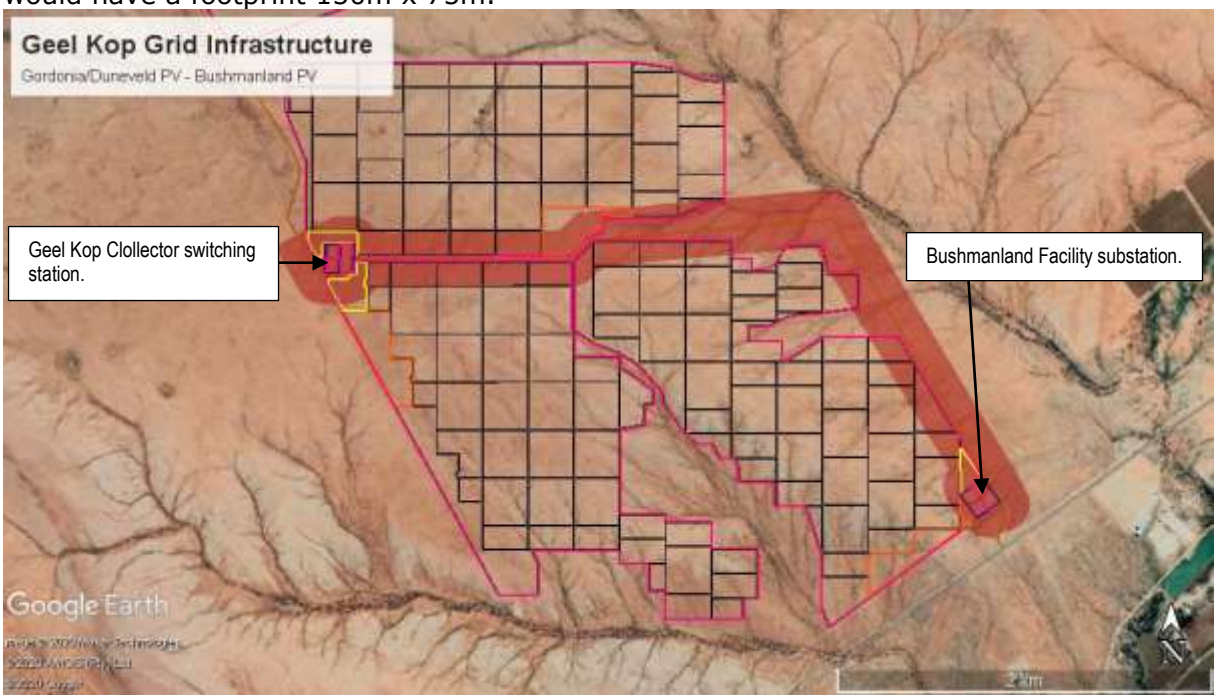

Figure 4: Power line corridor between Geel Kop collector switching station and Bushmanland PV facility substation/ collector switching station.

Alternative positions of the collector switching stations

As shown above, there are two alternative positions for the collector switching station, depending on which connection to the MTS is developed. These are described as follows and discussed separately below:

- Geel Kop collector switching station (preferred)
- Bushmanland PV collector switching station

Geel Kop collector switching station (preferred)

The Geel kop collector switching station is positioned to support the preferred connection route to the Upington MTS. It is positioned on the South West Corner of Gordonia Solar PV and North West Corner of Duneveld PV as shown below.

[3] It is unliklely that the Bushmanland collector substation would be constructed, as the Geel Kop Collector is preferred as it is centrally located. However, the overhead line between the Geel Kop Collector switching station and the approved Bushmanland facility substation would be constructed.

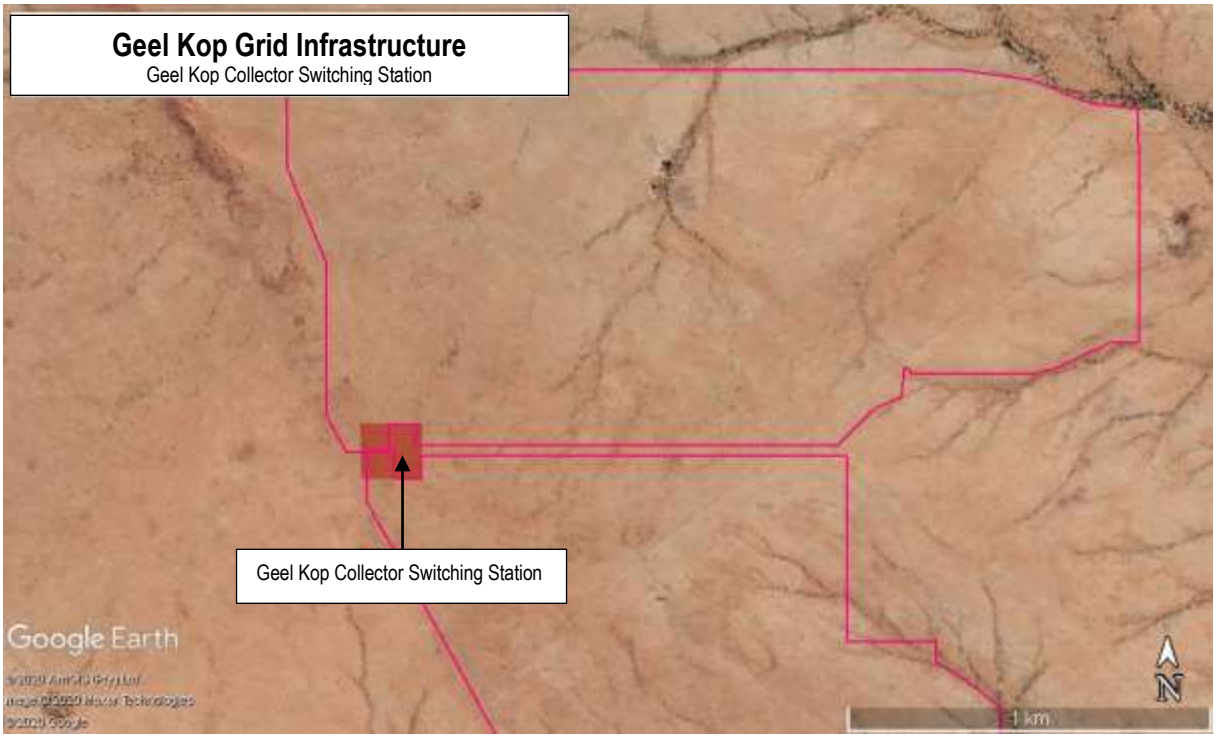

Figure 5: Proposed position of the preferred Geel Kop collector switching station

The Gordonia Solar PV/ Duneveld PV collector substation/ switching station has a footprint of 150m x 75m

Bushmanland PV collector switching station

The alternative collector switching station is positioned on the South Eastern Corner of Bushmanland PV as shown in the image below

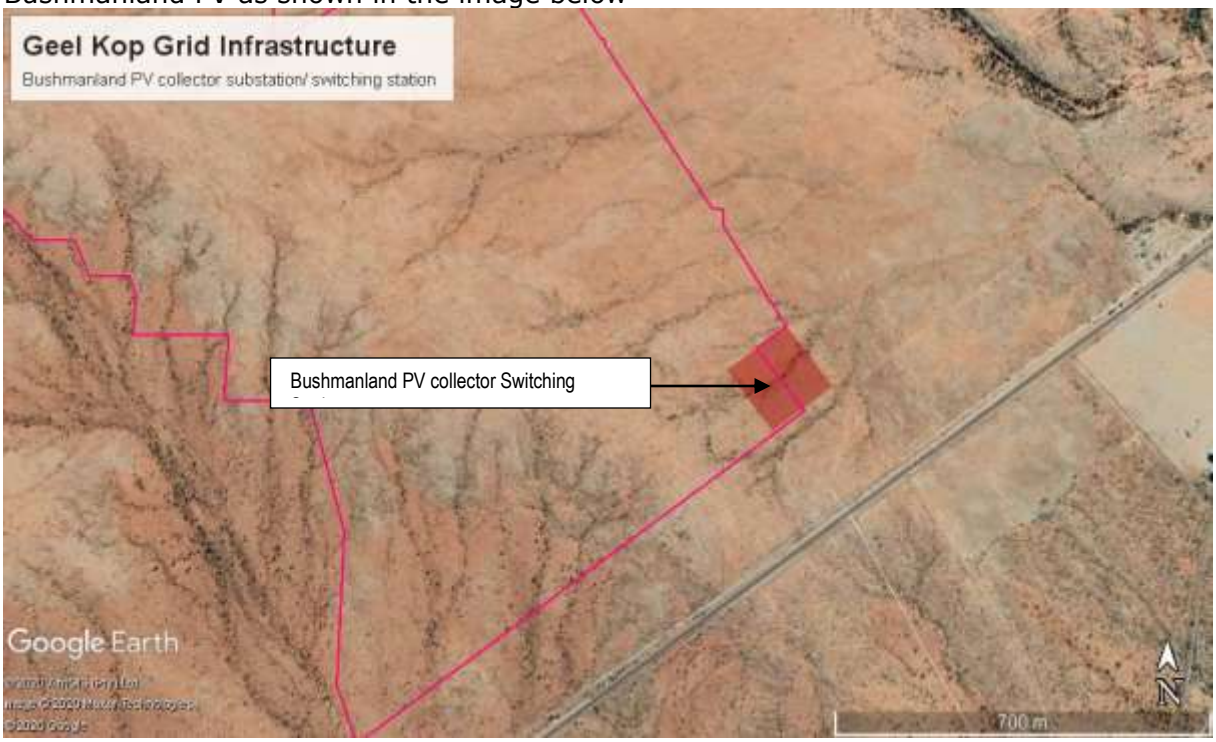

Figure 6: Position of Bushmanland PV collector substation/ switching station.

The Bushmanland PV collector switching station has a footprint of 150m x 75m.

Corridor alignments between the collector switching stations and the national grid

Two alternatives have been considered in this regard, namely:

- Alternative 1[4] : a double circuit 132kV line from the Geel Kop collector switching station to the Upington MTS, running parallel to the Eskom Aries-Upington 400kV 110m servitude to the Upington MTS.
- Updated Alternative 1 (preferred): a double circuit 132kV line from the Geel Kop collector switching station to the Upington MTS, running parallel to the Eskom Aries-Upington 400kV 110m servitude for approximately 7.2km, before turning towards the N14 and running along the N14 to the Upington MTS.
- Alternative 2: a loop in loop out (LILO) from the Bushmanland PV collector switching station into the McTaggerts / Oasis 132kV powerline, and reconductored as a double circuit 132kV line back to the Upington MTS.

These two[5] alternatives are discussed in the section below:

Alternative 1 – 132kV line from the Geel Kop collector switching station to the Upington MTS

This alternative includes a double circuit 132 kV powerline from Geel Kop collector switching station to the Upington MTS which is approx. 15km in length. This powerline will be aligned with the Aries-Upington 400kV Powerline (Authorised but not yet constructed) to the Upington MTS.

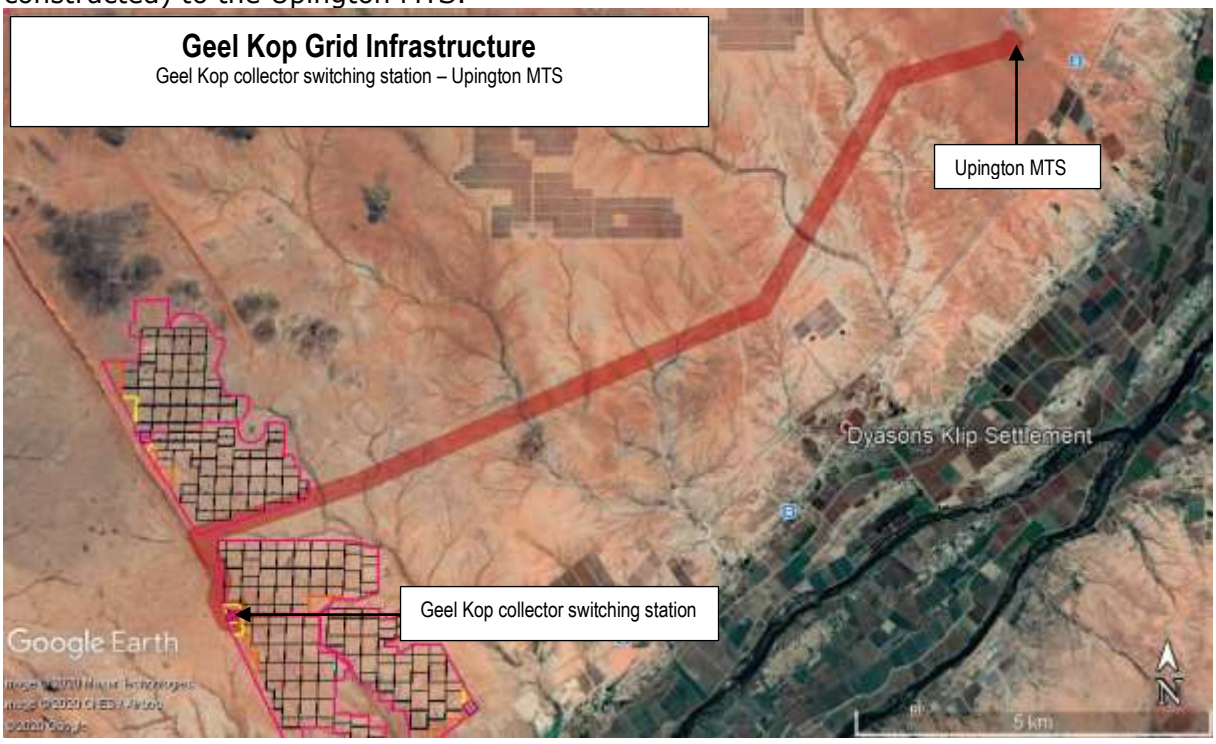

Figure 7: 132kV line from the Geel Kop collector switching station to the Upington MTS

Due to conflicting land use activities on the RE Farm 628, the previously preferred alternative 1 has been eliminated from further consideration in the

[4] This was the preferred alternative as considered during the Draft BAR. This Revised Draft BAR proposes an update to this previously preferred alternative, namely "Updated Alternative 1" as described in this section.
[5] Alternative 1 and Updated Alternative 1 are deemed to be the same alternative, as the original alternative 1 is no longer feasible.

environmental process and has been replaced with a new alternative, Updated Alternative 1, as described in the section below.

Updated Alternative 1 – 132kV line from the Geel Kop collector switching station to the Upington MTS

During the servitude option negotiations for the previously preferred alternative (Alternative 1), conflicting land uses on the RE Farm 628 were identified. This required that the previously preferred alternative be updated to avoid these conflicting land uses.

This updated preferred alternative includes a double circuit 132 KV powerline from Geel Kop collector switching station to the Upington MTS which is approx. 16km in length. This powerline will be aligned with the Aries-Upington 400kV Powerline (Authorised but not yet constructed) for approximately 7.2km before turning towards and along the N14 to the Upington MTS.

Figure 8: PREFERRED ALTERNATIVE (Updated Alternative 1):132kV line from the Geel Kop collector switching station to the Upington MTS.

Alternative 2 - loop in loop out (LILO) from the Bushmanland PV collector switching station into the McTaggerts / Oasis 132kV powerline.

The alternative connection is a loop in loop out (LILO) from the Bushmanland PV collector switching station into the McTaggerts / Oasis 132kV powerline, and reconductored as a double circuit 132kV line back to the Upington MTS.

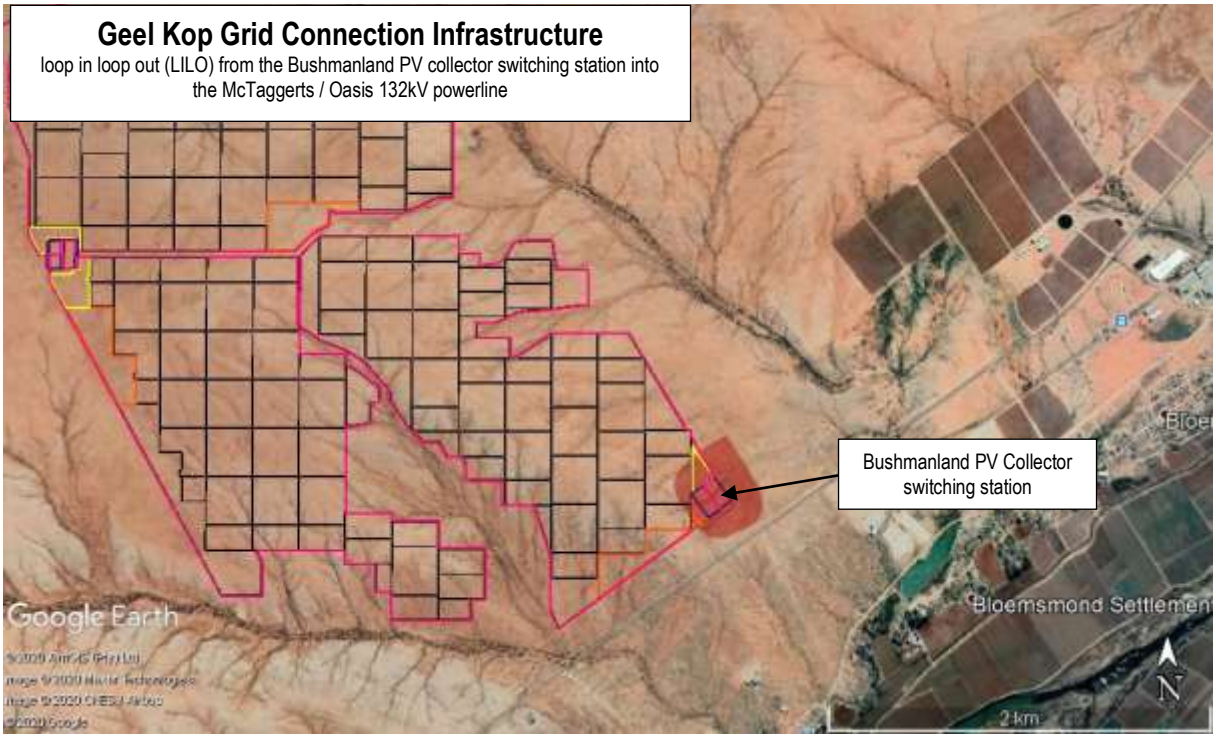

Figure 9: Position of loop in loop out (LILO) from the Bushmanland PV collector switching station into the McTaggerts / Oasis 132kV powerline

The Applicant has engaged with Eskom Grid Access Unit with regards the grid connection alternatives into the national grid. From a technical standpoint, the loop in loop out (LILO) alternative into the McTaggerts/Oasis 1 132kV powerline, with reconductored portion back to the Upington MTS along the existing servitude, is the least preferred technical solution for the primary reason that this is an existing powerline that services an existing generator (50 MW Khi CSP plant) as well as load customers in the area. Whilst Eskom has not objected to this connection alternative, they have stated that any connection to the McTaggerts / Oasis 1 132kV powerline will require very careful consideration and planning at Preferred Bidder stage to ensure least disruptions to all existing clients on this network. The risk of disruptions along this powerline therefore compels the Applicant to consider the preferred solution of a double circuit 132 kV powerline from the Geel Kop collector switching station to the Upington MTS.

The formal cost estimate letter CEL from Eskom has confirmed that the direct connection (as described as the updated alternative 1 above) is the most viable connection option.

Powerline Alternative 2 has been eliminated from further consideration in this environmental process.

1.4 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.

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 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 seven 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.

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[6]. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms.

1.5.2 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.

1.6 SPECIALIST DETAILS

Tony Barbour, the lead 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 260 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. Annexure C contains a copy of CV for Tony Barbour.

Schalk van der Merwe, the co-author of this report, has an MPhil in Environmental Management from the University of Cape Town and has worked closely with Tony Barbour on a number of SIAs over the last twelve years.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Schalk van der Merwe, the specialist consultants responsible for undertaking the study and preparing the Draft SIA Report, are independent and do not have vested or financial interests in the proposed development being either approved or rejected. Annexure D contains a copy of signed declaration of independence.

1.8 REPORT STUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction

[6] GN 113 and GN114 of 2018

- 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.

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[7]" 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 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);
- Northern Cape Province Green Document (2017/2018);
- ZF Mcgawu District Municipality Integrated Development Plan (2017-2022);
- Kai !Garib Local Municipality Integrated Development Plan (IDP) (2018/19);

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 this regard, the preamble makes direct reference to renewable resources, including solar and 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 (…);

[7] 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.

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[8], 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 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;

[8] 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).

- 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 terms 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

The integrated resource plan (IRP) is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The IRP 2010 was intended to be a 'living plan' that would be periodically revised by the DoE. However, this was never done and resulted in an energy mix that failed to adequately meet the constantly changing supply and demand scenarios in South Africa, nor did it reflect global technological advancements in the efficient and responsible generation of energy.

On 27 August 2018, the then Minister of Energy published a draft IRP which was issued for public comment (Draft IRP). Following a lengthy public participation and consultation process the Integrated Resource Plan 2019 (IRP 2019) was gazetted by the Minister of Mineral Resources and Energy, Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030. The IRP is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost.

Since the promulgated IRP 2010, the following capacity developments have taken place. A total 6 422MW under the government led Renewable Energy Independent Power Producers Programme (RE IPP Procurement Programme) has been procured, with 3 876MW currently operational and made available to the grid. In addition, IPPs have commissioned 1 005MW from two Open Cycle Gas Turbine (OCGT) peaking plants. Under the Eskom build programme, the following capacity has been commissioned: 1 332MW of Ingula pumped storage, 1 588MW of Medupi, 800MW of Kusile and 100MW of Sere Wind Farm. In total, 18 000MW of new generation capacity has been committed to.

Provision has been made for the following new additional capacity by 2030:

- 1 500MW of coal;
- 2 500MW of hydro;
- 6 000MW of solar PV;
- 14 400MW of wind;
- 1 860MW of nuclear;
- 2 088MW for storage;
- 3 000MW of gas/diesel; and
- 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.

Figure 2.1 provides a summary of the allocations and commitments between the various energy sectors.

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400 1,000	1,600			
2023	750	-555				1000	1,600			500
2024			1,860				1,600		1000	500
2025						1000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2000	500
2028		-475				1000	1,600			500
2029		-1,694			1575	1000	1,600			500
2030		-1,050		2,500		1000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Figure 2.1: Summary of energy allocations and commitments

As indicated above, the changes from the Draft IRP capacity allocations see an increase in solar PV and wind, and a significant decrease in gas and diesel; and new inclusions include nuclear and storage.

In terms of renewable energy four bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant technology in the IRP2019 is renewable energy from wind and solar PV technologies, with wind being identified as the stronger of the two technologies. There is a consistent annual allocation of 1 600MW for wind technology commencing in the year 2022 up to 2030. The solar PV allocation of 1 000MWs per year is incremental over the period up to 2030, with no allocation in the years 2024 (being the year the Koeberg nuclear extension is expected to be commissioned) and the years 2026 and 2027 (presumably since 2 000MW of gas is expected in the year 2027). The IRP 2019 states that

although there are annual build limits, in the long run such limits will be reviewed to take into account demand and supply requirements.

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 strengthening 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 a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The study area is located within the Upington REDZ (Figure 2.2), which was formally gazetted in 2018[9]. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms.

[9] GN 113 and GN114 of 2018

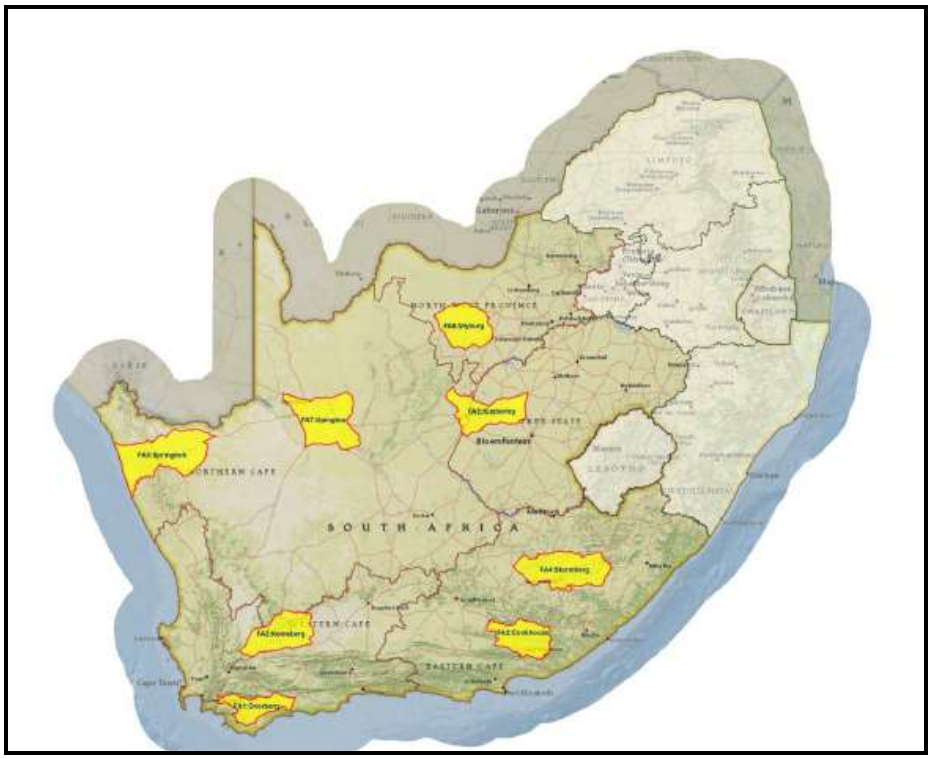

Figure 2.2: Location of Renewable Development Zones in South Africa *(Source CSIR)*

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:

- 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 makes 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 SEF 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 that 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 km^2 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, is identified 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 Northern Cape Province Green Document 2017/2018

The NCP Green Document was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50 km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018 a total of 23 IPP projects in the province had been integrated into the national grid. These projects include Solar PV, Concentrated Solar and WEFs. The document notes that through their economic development obligations these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, the collectively hold a tremendous potential for socio-economic upliftment.

Key issues identified with regard to improving the potential beneficial impact of IPPs in the NCP include:

- Local community members abusing project benefits for personal gain;
- Difficulty in outreach to local community beneficiaries due to high local illiteracy levels;
- A lack of business skills generally hampers the successful establishment of local small enterprises which could benefit from projects;
- Community benefit obligations are currently met in a piecemeal and uncoordinated fashion;
- Anticipated community benefits are often frustrated by inadequate engagement and insufficient ongoing consultation;
- The scarcity of people skilled in maths and sciences in local communities hampers meaningful higher-level local skills development and employment; and
- Insufficient support from local municipalities for IPP development.

2.3.4 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.

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.

2.3.5 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 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

(Source, KGLM IDP)[10]

[10] The Dyasonsklip 1 and Sirius Solar PV project One are both fully operational, with Dyasonsklip 2 due to be commissioned in April 2020.

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;
- Site and the surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Kai !Garib Local Municipality (KGLM), which forms part of the larger ZF Mgcawu District Municipality (ZFMDM)[11](Figure 3.1). The main land uses in the area are linked to grape farming and agriculture along the Gariep River and livestock and game 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.

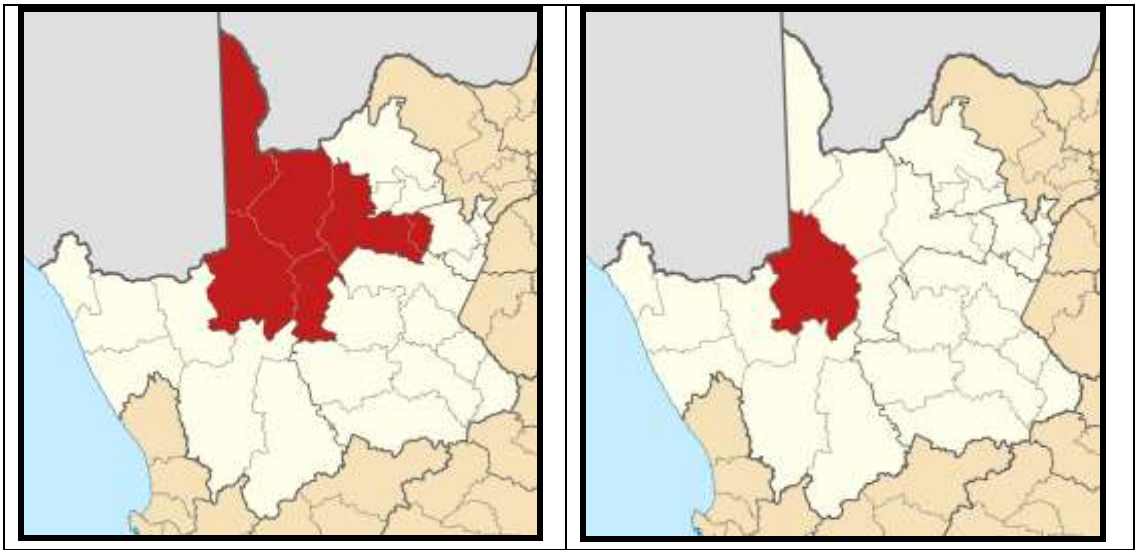

Figure 3.1: Location of ZF Mgcawu District Municipality (left) and Kai! Garib Local Municipality (right) within the Northern Cape Province

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

3.3 PROVINCIAL CONTEXT[12]

The proposed grid infrastructure 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, while 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).

[12] 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[13]. 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.

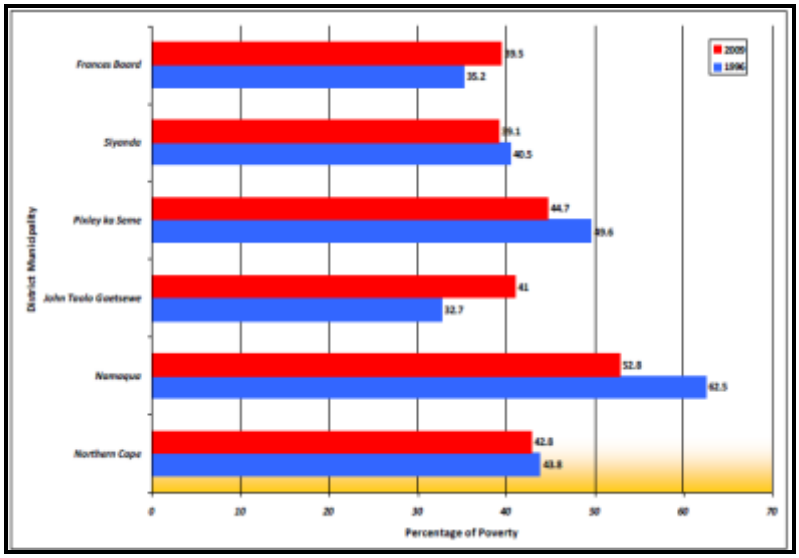

Figure 3.2: Percentage of people living in poverty in the Northern Cape (Source: Global Insight, 2009 as cited in the PGDS, July 2011)[14].

[13] 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.

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

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[15]. 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%.

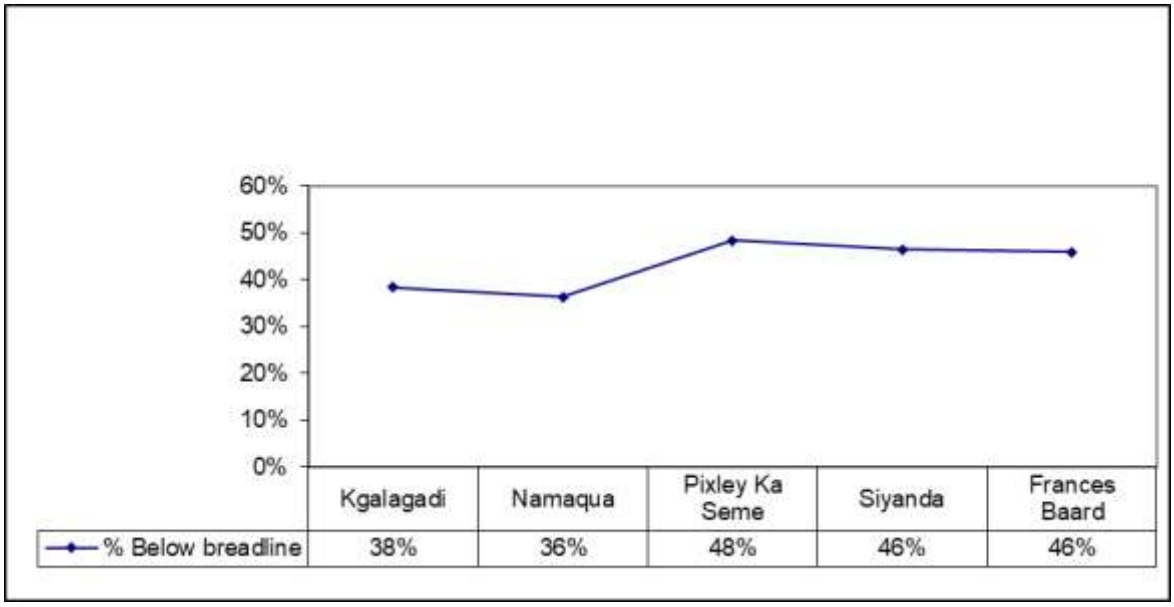

Figure 3.3: Percentage of household income below the poverty breadline by district (*Source: Northern Cape PGDS)*

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.

[15] 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.

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).

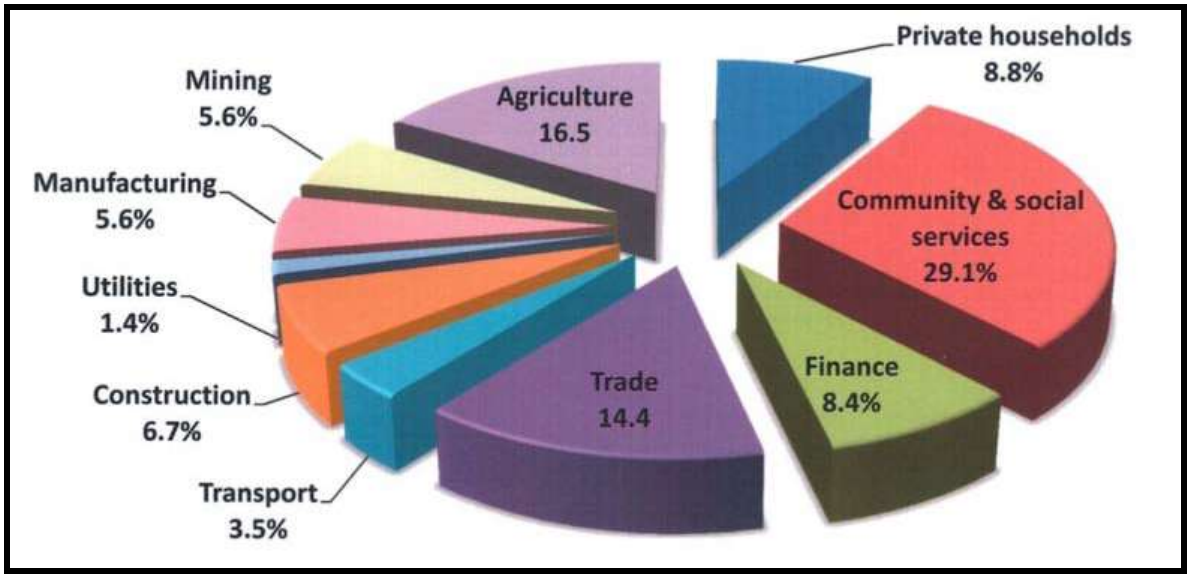

Figure 3.4: Employment by Economic Sector and Industry (Source: Statistics South Africa 2012).

3.4 ZF MGCAWU DISTRICT MUNICIPALITY

The ZF Mgcawu District Municipality (ZFMDM) consists of six Local Municipalities namely, Dawid Kruiper[16]; 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 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 Orange River (Gariep 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.

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

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[17]. 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 of the inhabitants in the KGLM and is critical to the area's 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.

[17] 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.

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.

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 on 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 (i.e. people younger than 15 or older than 64) to the working age population (i.e. those aged 15-64).

Household income

Based on the data from the 2016 Household Community Survey, 5.1% of the population of the KGLM had no formal income, 2% earned between R 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 of the economically active population in the KGLM decreased from 10% in 2011 to 6.7% in 2016 (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 figures appear 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 services, 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 subjects 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 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) also play a key role in terms of the local economy by providing access to and from markets.

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 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 as 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 well developed 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 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. Therefore, 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 development 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. 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 SEZ (± 400 ha) will be a purpose-built industrial estate linked to the Upington Airport and will leverage fixed direct investments in value added and export-oriented manufacturing industries.

3.7 SITE AND SURROUNDING LAND USES

3.7.1 Land uses and settlement patterns

The site (RE Geel Kop Farm No 456) is located to the north of the N14, approximately 8 km north-east of Keimoes, and 23 km south-west of Upington (Photograph 3.1). The N14 links Upington in the east to Springbok and the N7 Cape-Namibia route in the west, via Keimoes, Kakamas and Pofadder. Kanoneiland and a number of smaller islands are located along this intensively cultivated stretch of the Orange (Gariep) River. The study area settlement pattern is associated with a number of small settlements, farmsteads, labourers' housing, and agro-processing facilities and is essentially contained to the area between the Orange (Gariep) River and the N14, with most agro-processing facilities located in proximity to the N14. No houses or settlements are located to the north of the N14, but a few vineyard blocks and associated processing facilities are located at Kanoneiland Road (Straussheim) and Klippunt to the east of the site.

Photograph 3.1: N14, looking west (towards) Keimoes. The entrance road to the southern portion of RE Geel Kop Farm No 456 is visible on the left

A number of small settlements are located near the northern bank of the Orange (Gariep) River. These include Soverby, Currie's Camp, Mc Taggart's Camp, Bloemsmond, Klippunt, Ses Brugge, Klippunt, Dyasons Klip Settlement, Oranjevallei, Louisvale, Kanoneiland and Kalksloot. A number of these settlements originated on local farms and mission land. Of these settlements, Soverby is located 5.7 km to the south-west (Photograph 3.2), Currie's Camp 2.4 km to the south (Photograph 3.3), and Bloemsmond 2.5 km to the south-east (Photograph 3.4).

Photograph 3.2: Houses in Soverby seen from the main road through the settlement

Photograph 3.3: Houses in Currie's Camp seen from the eastern outskirts of Soverby

Photograph 3.4: Bloemsmond settlement seen from the north from the N14

All the settlements are essentially residential in nature, but also support a few schools, churches and clinics. The communities rely on Upington and, to a lesser extent Keimoes, for retail and higher order services. While most of the housing consists of formal structures, backyard structures occur in most of the settlements. Most of employment opportunities in the area are associated with local agriculture in the area. Due to the strong seasonality of grape farming, seasonal unemployment levels in the

communities is high. Many farms in the study area currently also prefer to make use of Tshwana labour teams recruited from the area around Kuruman for all major harvesting and pruning.

Agriculture forms the economic and cultural backbone of the study area. Due to the natural aridity of the region, activities are concentrated along the Orange (Gariep) River. The farms in the area were historically laid out as narrow strips stretching inland from the river. The farming activities are concentrated in the areas close to the river, with the remainder of the farm areas located north of the N14 only suitable for extensive grazing. The N14 therefore tends to form a boundary between the settled and cultivated area to the south of the road and grazing land located to the north.

The study area economy is overwhelming linked to grape farming, and to lesser extent stock farming. Water is the main constraining factor to grape farming activities. The focus is on the production of drying grapes and wine grapes, but table grapes are also produced by growers on Kanoneiland. The area is of national significance as a producer of raisins and sultanas (Photograph 3.5). It is also a major producer of wine grapes, largely processed at local cellars. Some of the grapes are however also sold to cellars as far as afield as the Western Cape. Until a few years ago, the study area was the country's largest producer of grape juice concentrate for the food and beverage sector. However, this sector has been impacted by international competition and most of the plants have been mothballed for the time being.

Photograph 3.5: Raisins drying on a farm on Kanoneiland

The head-offices of the Karsten Group, a large multi-national fruit and vegetable exporting operation, is located on the southern bank of the Orange (Gariep) River, south of Kanoneiland. The Karsten Group is one of the largest exporters of table grapes in the Southern Hemisphere. The Group also has a livestock farming operation bordering onto the site.

There are a limited number of vineyard blocks in the study area located to the north of the N14, all of which are located immediately adjacent to the N14 (Photograph 3.6). This is due to the high costs associated with irrigating lands located at distance from the Orange (Gariep) River. Large drying operations are located on many study area properties. These include the Fruits du Sud operations at the intersection of the N14 and Kanoneiland Road 2.5 km to the east of the site (Photograph 3.7), Klippunt 12 km to the east, and on Geel Kop Farm adjacent to the N14.

Photograph 3.6: Vineyards and packing stores on a portion of Straussheim farm (Fruits du Sud) located to north of the N14

Photograph 3.7: Fruits de Sud's raisin processing facility near the N14-Kanoneiland Road intersection

The areas used for livestock grazing are traditionally used for raising small-stock, especially sheep. Due to the low rainfall, the carrying capacity of the veld is low, approximately 44 hectares to one head of cattle. Due to high levels of stock theft, sheep farming has largely been phased out or radically scaled down on all study area farms adjacent to the N14. This includes RE Geel Kop Farm No 456 as well as adjacent Bloemsmond and Currie's Camp farms, located to the east and west of the site respectively. Cattle, less vulnerable to stock theft, have also been introduced on a number of farms. However, the area is not regarded as optimal for cattle (Photograph 3.8). Currently, the only significant stock farming operation in proximity to the site is associated with the Karsten Group's van Rooisvlei operation, which is located directly to the north of the site. No commercial game farming is carried out in significant proximity to the site. Access to the farming area to the north of the site(e.g. van Rooisvlei farm) is via the D3276 gravel road (Lutzputs Road), which intersects with the N14 approximately 16 km to the east of the site.

The local tourism sector is relatively underdeveloped and mainly associated with through-traffic on the N14. A number of facilities offer a range of accommodation facilities on Kanoneiland and in and around Keimoes. The historic Rebellion Tree located on van Rooisvlei, just to the north of the site. is not currently accessible to the public. Wineries are located on at least two estates to the south of the N14. Bezalel,

which specializes in cognac-type brandies is located relatively close to the site. The entrance gate to Bezalel is located to the south of the N14 approximately 6 km east of the site (Photograph 3.9). The visitors' centre is located 800 m south of the N14 and is screened from the road by orchards and vineyards.

Photograph 3.8: Grazing land on portion of the site north of the N14

Photograph 3.9: Entrance to Bezalel wine farm

The grid associated with the seven proposed PV facilities located on the site will feed into Eskom's Upington MTS located approximately 12.5 km east of the site. (Photograph 3.8). The facility is located 1.3 km north of the N14 and is accessed via a dedicated entrance road off the D3276 gravel road.

Photograph 3.8: Eskom's Upington MTN substation seen from the entrance road to the facility off the D3276 gravel road.

Four existing 132 kV lines are located to the north of the N14. One links Eskom's Omnia substation to the Upington MTS, while the other three are associated with existing SEFs. The link up to the Omnia substation is located to the north of the N14 and runs parallel to the road. This is the only existing line that traverses the site. A Telkom line is located directly to the north of the road (Photograph 3.9).

Photograph 3.9: Existing Eskom and Telkom lines located to the north of the N14

The three transmission lines associated with existing SEFs in the area are located on properties to the east of the site. The transmission line associated with the Daysonsklip 1 and 2 SEFs traverse the southern portions of the farms Dayson's Klip, McTaggart's Camp and Olyvenhoutsdrift (Photograph 3.10). The Upington MTS is located on a portion of Olyvenhoutsdrift. The lines from the Khi One CSP and Sirius PV SEF (both located on Mc Taggart's Camp) traverse the southern portion of McTaggart's Camp and Olyvenhoutsdrift. These lines feed into the Upington MTS from the north-west, approximately 1.4 km north of the N14. The lines are not readily visible from the N14.

Photograph 3.10: Daysonsklip 1&2 SEF substation and 132 kV line on Dayson's Klip

3.7.2 Affected properties

The proposed transmission line affects 5-6 properties located to the east of the site and north of the N14 (Figure 3.5). Existing transmission lines traverse all the affected properties. In addition, SEFs have been proposed or constructed on at least 4 of the properties. The affected properties include the farms Geelkop, Bloemsmond, Dayson's Klip, Mc Taggart's Camp, and Oliewenhoutsdrif (Klippunt). Currie's Camp located to the west of the site is not directly affected by transmission lines. However, as indicated in Figure 3.5, the internal transmission line runs along the boundary between the site and Currie's Camp. Similarly, Farm 444 adjacent to the north of Geelkop would not be directly affected.

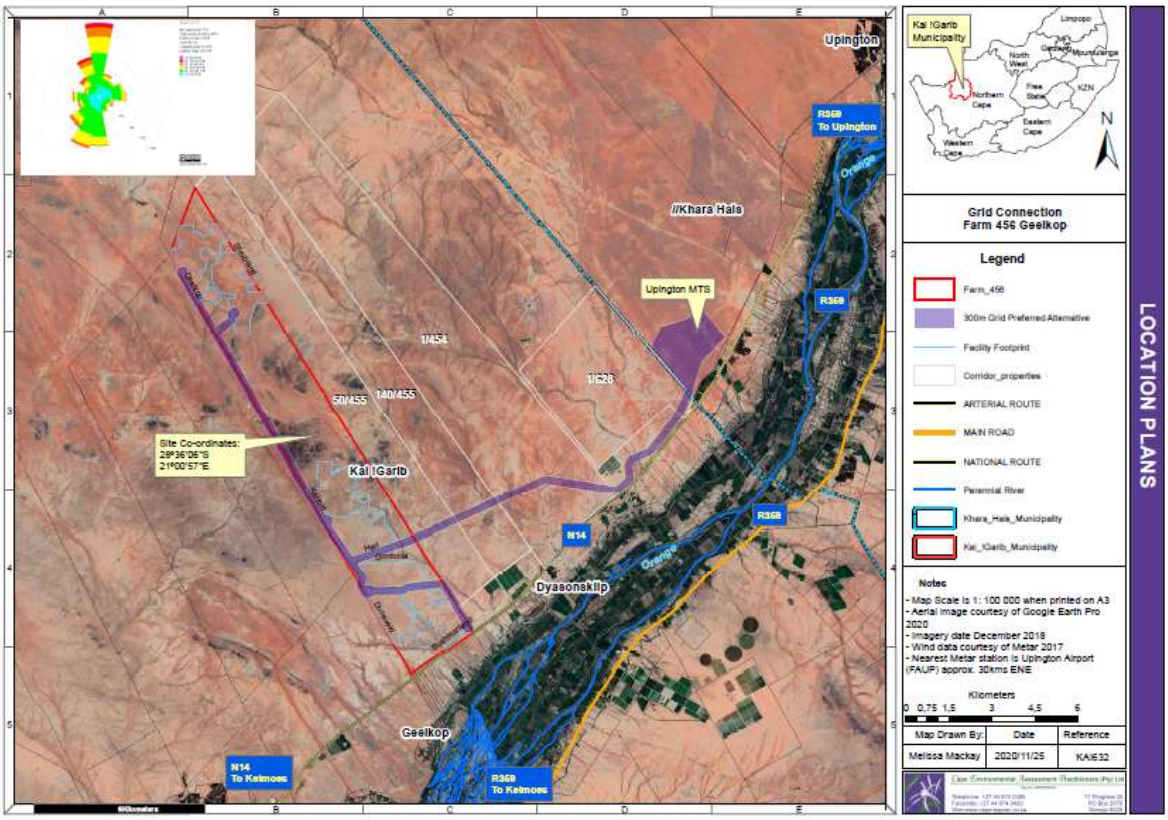

Figure 3.5: Alignment of transmission line

Currie's Camp 457/1 is located directly to the west of the site. The portion north of the N14 is approximately 4 000 ha in extent and shares a 17 km boundary with the northern portion of the site. Currie's Camp The property forms part of former church lands granted to 460 beneficiaries of the Soverby, Currie's Camp and McTaggart's Camp communities in 2000. The land has been pooled and is farmed as a community enterprise by the Blocuso Trust. Thanks to ongoing financial and technical support, a thriving raisin and wine grape farming operation has been established on the portion adjacent to the south of the N14. Approximately 59 ha of vineyard has been developed (Photograph 3.1).

Photograph 3.11: Vineyards on portion of Blocuso located just to the south of the N14 seen from the access road to Soverby settlement

A large pump station, offices, a large shed and drying operations are located near the intersection of the N14 and the Soverby access road. Blocuso's grape farming operation currently provides full time employment to 24 people from the relevant communities. An additional 110 seasonal opportunities are associated with the operation. Due to stock theft, members of the relevant communities no longer use the portion north of the N14 for grazing. This portion of the farm is uninhabited and rented out to a commercial farmer for grazing. Blocuso has identified the potential for accommodating SEF developments on the northern portion of the property, but there are currently no proposals (van Rooyen – pers. comm).

All seven of the proposed SEFs are located on RE Geel Kop Farm No 456, owned by Mr Koos Snyman, who lives on the property. Mr Snyman farms the property together with his son Francois. The focus of the farming activities is on the production of grapes, supplemented by raising livestock. Grape farming activities are associated with the production of raisins, sultanas and wine grapes (Photograph 3.12). Raisins and sultanas (approximately 130 t/a) are processed on the property at a facility located just to the south of the N14 (Photograph 3.13). Wine grapes (approximately 300 t/a) are sold to Orange River Cellars' winery outside Keimoes. The operation currently provides permanent employment for 8 workers. The workers and their families all reside on the farm. In addition, the operations create 85-90 casual opportunities, the bulk of which (80) is seasonal and associated with harvesting and pruning seasons. Sufficient land for potential vineyard expansion is available on the portion of the farm south of the N14 (F Snyman – pers. comm).

Photograph 3.12: Vineyards and Eskom distribution line located to the south-west of the site

Photograph 3.13: Sultanas in the process of drying on RE Geel Kop Farm No 456

The portion of the farm to the north of the N14 is uninhabited. Due to stock theft, traditional stock farming activities on this portion have been scaled down over the past 15 years. Camps located adjacent to the N14 have proven particularly vulnerable. This portion of the farm currently supports a small flock of sheep and a small herd of cattle, fewer than 100 head in total (F Snyman – pers. comm). The internal line and substations would be located near the western boundary with Currie's Camp and across the southern part of the site north of the N14 (Photograph 3.14).

Photograph 3.14: Looking south from just inside the boundary fence between the site (left) and Currie's Camp

Farm 444 is located directly to the north of Gee Kop Farm and forms part of the Karsten Group's local livestock farming operation, which also includes 4 adjacent properties. The property is accessed off the DR 3276 gravel road. The operation covers an area approximately 15 000 ha in extent. The van Rooisvlei farmstead, located approximately 1.3 km north of the site, is not inhabited. No staff live on the property and entrance gates to the farm are kept locked. The Rebellion Tree (where the 1914 Rebellion was openly declared) is located just to the north of the farmstead. The tree is now only accessible to the public by private arrangement. The property is used for raising sheep and cattle. Karsten's local livestock operation employs 15-20 people on a permanent basis. The stock farming operation is managed from Karsten's main Roepersfontein farm south of Kanoneiland. While the van Rooisvlei operation is not

located in proximity to the N14, the operation is still considered vulnerable to stock theft due to its proximity to the D3276 gravel road (Theron – pers, comm).

Bloemsmond Farm is located to the east of the site. The property is owned by Mr Willie Snyman. The main activities on the farm are located to the south of the N14 and are associated with grape farming, mainly for drying. The portion north of the N14 is used for grazing as part of a larger operation which also includes grazing farms in the Kalahari. Combined operations currently provide permanent employment opportunities to 32 people, all of whom tenured on Bloemsmond. In addition, the operation provides up to 400 seasonal opportunities. Up to five SEFs are proposed on the portion of Bloemsmond north of the N14 (different EIA processes) (W Snyman – pers. comm).

Dayson's Klip (454/RE) is located to the east of Bloemsmond Farm. The farm is 5 725 ha in extent. The section of the farm to the south of the N14 accommodates vineyards, agro-processing and residential uses, a public gravel road and the Upington-Keimoes railway line (Photograph 3.15). The owner, Mr Botha du Toit and his family live on the property. Primary farming is focused on the cultivation of drying and wine grapes. The portion of the property north of the N14 is historically used for grazing. Combined farming operations provide 30 tenured employment opportunities and 80 seasonal ones (Theunissen – pers. comm). The area to the north of the N14 also accommodates two existing SEFs, namely Daysonsklip 1 and 2. Daysonsklip 1 has been operational since February 2020. Daysonsklip 2 is currently under construction and is expected to be commissioned by the end of April 2020. The area consists of open veld with low carrying capacity (Photograph 3.16). Up to three additional SEFs (Daysonsklip 3-5) are currently proposed on the property.

As indicated above, two transmission lines feeding into Upington MTS are located on the portion of Dayson's Klip. The transmission line associated with the seven proposed Geel Kop PVs would traverse Dayson's Klip.

Photograph 3.15: Dayson's Klip farmstead, seen from the gravel road along the northern banks of the Gariep

Photograph 3.16: Daysonklip 1 SEF access road and 132 kV Daysonsklip line

Mc Taggart's Camp 453 is located to the east of Dayson's Klip. The property is communally owned and historically supported livestock grazing and a small tungsten mine. Two SEFs are located on the central portion of the property, just to the south-east of the Daysonsklip 5 site, namely Abengoa's 50 MW Khi Solar One SEF, and Scatec's Sirius 85 MW PV SEF located just to the north-east of Khi One. Khi Solar One became operational in 2016. Due to glare, the 205 m tower structure is prominently visible from the N14 and adjacent farms (Photograph 3.17). The Sirius SEF represents Phase 1 of Scatec's plan to develop 3 SEFs (Phases 2 and 3 being Daysonsklip 1 and 2). Sirius was constructed during 2019.[18] Both facilities feed into the Upington MTS via lines affecting the portion of the property north of the N14 and south of these facilities.

Photograph 3.17: Tower on Khi One SEF, seen from the eastern boundary of Dayson's Klip just to the south of the Daysonsklip 1 SEF site.

Limited information was available on the Oliewenhoutdrift property on which the Upington MTS is located. It is understood to be owned by the Klippunt community and is used for grazing. The Upington MTS is located approximately 1.4 km to the north of the small settlement of Klippunt south of the N14.

[18] https://scatecsolar.com/2020/02/25/another-86-mw-of-scatec-solars-258-mw-solar-power-complex-in-south-africa-in-commercial-operation/

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 on-site substations associated with each of the seven PVs will have no bearing on the nature and significance of the social impacts associated with the transmission line. The substations have therefore not been assessed.

4.2 ASSESMENT OF POLICY AND PLANNING FIT

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 site is also located within the Upington Solar REDZ, which was formally gazetted in 2018[19]. The area has therefore been identified as suitable for the establishment of renewable energy facilities and the associated grid connection infrastructure.

[19] GN 113 and GN114 of 2018

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

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 the grid connection will extend over a period of approximately 12 months and create in the region of 130 employment opportunities. Based on similar projects, approximately 40% of the jobs will benefit low-skilled workers, 40% semi-skilled and 20% high skilled. Members from the local communities in the area, including Brugge, Klippunt, Dyasons Klip, Oranjevallei, Louisvale, Kanoneiland, 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. The majority of these employment opportunities are also 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. 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 grid 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 will be in the region of R 20 million (2020 Rand values). This is based on assumption of R 8 000 per month for low skilled workers, R 12 000 per month for semi-skilled workers and R 25 000 per month for high skilled workers. A percentage of the wage bill 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 grid infrastructure 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 Mr 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.

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 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.

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 grid connection on its own does not constitute a large construction project, the proposed establishment of a number of other SEFs, and the associated grid infrastructure, 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 later. 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 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;
- 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 an access road of the N14. The movement of heavy construction related traffic and the transport of workers to and from the site on a daily basis may pose safety risks to other road users. The stakeholders interviewed indicated that the issues associated with the movement of construction vehicles can be effectively mitigated.

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 agreed upon access road/s;
- 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;

- 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 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.

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

4.4.1 Development of renewable energy infrastructure

The establishment of renewable energy infrastructure, including the grids associated with SEFs, should be viewed, firstly within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

Impact of a coal powered economy
The Green Jobs study (2011) notes that South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country's growth potential and redirecting its development trajectory in the 21st century. The study also identifies a number of advantages associated with renewable energy, which include no emissions of carbon dioxide (CO_2) in the generation of electricity and low lifecycle emissions. The construction period for renewable energy projects, such as the proposed SEF, is much shorter than that of conventional power stations, while an income stream may in certain instances be provided to local communities through employment and land rental. The study also notes that the greenhouse gases (GHG) associated with the construction phase are offset within a very short period of time compared with the project's lifespan. Renewable energy therefore provides an ideal means for reaching

emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa, wind as energy source is not dependent on water (as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

The Greenpeace Report (powering the future: Renewable Energy Roll-out in South Africa, 2013), notes that within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. Acid mine drainage from abandoned mines in South Africa impacts on water quality and poses the biggest threat to the country's limited water resources. Huge volumes of water are also required to wash coal and cool operating power stations. Eskom uses an estimated 10 000 litres of water per second due to its dependency on coal (Greenpeace, 2012).

Benefits associated with REIPPPP

The overview of the IPPPP (2019) indicates that the REIPPPP has attracted R48.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and IS2). This is more than double the inward FDI attracted into South Africa during 2015 (R22.6 billion). In terms of local equity shareholding, 48% (R31.5 billion) of the total equity shareholding (R66.7 billion) was held by South African's across BW1 to BW4, 1S2 and 1S2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R 35.8 billion and contributes 52% to total equity. As far as Broad Based Black Economic Empowerment is concerned, Black South Africans own, on average, 31% of projects that have reached financial close, which is slightly above the 30% target.

The total projected procurement spend for during the construction phase was R75 billion, more than the projected operations procurement spend over the 20 years operational life (R72 billion). The combined (construction and operations) procurement value for BW1 to BW4, 1S2 and IS2 is projected as R147.6 billion, of which R50.1 billion has been spent to date. For construction, of the R46.4 billion already spent to date, R36.6 billion is from the 57 projects which have already been completed. These 51 projects had planned to spend R36.6 billion. The actual procurement construction costs have therefore exceeded the planned costs by 9% for completed projects. Of the R46.6 billion spent on procurement during construction, R41.1 billion has reportedly been procured from BBBEE suppliers, achieving 89% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion. The R41.1 billion spent on BBBEE during construction already exceeded the R34.8 billion that had originally been anticipated by IPPs.

The report notes that for a programme of this magnitude, with construction procurement spend alone estimated at R75 billion, the result is a substantial stimulus for establishing local manufacturing capacity. The report also notes that the strategy has prompted several technology and component manufacturers to establish local manufacturing facilities. The report also notes that this will improve with greater certainty relating to subsequent bid windows and further determinations will continue to build on these successes.

In terms of employment, to date, a total of 32 532 job years[20] have been created for South African citizens, of which 29 046 were in construction and 3 486 in operations.

[20] The equivalent of a full time employment opportunity for one person for one year

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 80%, 41% and 52% of total job opportunities created by IPPs to date. These job years should rise further past the planned target as more projects enter the construction phase. The REIPPPP has also ensured that black people in local communities have ownership in the IPP projects that operate in or nearby their vicinities. On average, black local communities own 11% of projects that have reached financial close. This is well above the 5% target.

The WWF (2014) study also notes that the REIPPPP requirement of 30% allocated to the local economic development has ensured that non-price criteria linked to socio-economic up-liftment have a much heavier weighting than they would normally enjoy under Government's preferential procurement policy (WWF, 2014). The establishment of renewable energy facilities, such as the proposed SEF, therefore not only address the environmental issues associated with climate change and consumption of scarce water resources, but also creates significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.

Table 4.8: Implementation of clean, renewable energy infrastructure

Nature: Development of infrastructure to generate clean, renewable energy		
	Without Mitigation	**With Mitigation**
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	High (64)	High (85)
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO_2 emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Overall reduction in CO_2 emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.		
Residual impacts: See cumulative impacts		

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

Recommended mitigation measures
Should the project be approved the proponent should:

- Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members;

- Maximise opportunities for local content, procurement and community shareholding.

4.4.2 Creation of employment opportunities

The potential employment opportunities associated with grid infrastructure component of the proposed Geel Kop PVs will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits will therefore be limited.

Table 4.9: 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.

4.4.3 Benefits associated with the establishment of a Community Trust

The benefits associated with the proposed Geel Kop PVs 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.

An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward socio-economic development (SED) initiatives. These contributions are linked to Community Trusts and accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education and skills development.

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

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

Socio-economic development

Socio-economic development (SED) contributions represent an important focus of the REIPPPP and is aimed at ensuring that e that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward SED initiatives. These contributions accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education and skills development.

The SED contributions associated with the 64 IPPs has to date amounted to R 860.1 million. The majority of the spend has been on education and skills development (40.9%), followed by enterprise development (24.2%), social welfare (21.3%), general administration (9%) and health care (4.5%). In terms of education, the IPPs have supported 1 044 education institutions, with a total spend of R 236.7 million between 2015 and March 2018. It is estimated that these contributions have benefitted in the region of 375 737 learners.

The province with the highest SED contribution has been the Northern Cape Province, followed by the Eastern Cape and Western Cape.

Enterprise development contributions

The target for IPPs to spend on enterprise development is 0.6% of revenues over the 20- year project operational life. Enterprise development contributions committed for BW1 to BW4, 1S2 and 2S2 amount to R7.2 billion. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of March 2019 a total of R 254.3 million had already been made to the local communities located in the vicinity of the 64 operating IPPs.

The Green Jobs study (2011), found that the case for renewable energy is enhanced by the positive effect on rural or regional development. Renewable energy facilities

located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues. The findings of the thesis by Tait (2012) also note that the distributed nature of renewable energy generation can induce a more geographically dispersed pattern of development. As a result renewable energy sites can be highly suited to rural locations with otherwise poor potential to attract local inward investment thus able to target particularly vulnerable areas. In her conclusion Tait notes that thesis found positive evidence for the establishment of community benefit schemes in the wind sector in South Africa. The BBBEE requirements for developers as set out in the DoE's IPPPP for renewables was the primary driver for such schemes. The procurement programme, in keeping with the objective of maximising the economic development potential from this new sector, includes a specific focus on local communities in which wind farms are located.

The establishment of Community Trusts associated with renewable energy projects do therefore create significant benefits for local rural communities. However, Community Trusts can also be mismanaged. This is an issue that will need to be addressed when setting up the trust.

Mr McKay, the Director of Planning at the KGLM, indicated that the benefits from the Community Trust should focus on the local communities in the immediate vicinity of the site.

Table 4.10: Assessment of benefits associated with establishment of community trust

Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	Without Mitigation	**With Enhancement[21]**
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Medium (30)	High (65)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement: See below		
Cumulative impacts: Promotion of social and economic development and improvement in the overall well-being of the community		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the supporting the social and economic development in the area would be lost. This would also represent a negative impact.

Recommended enhancement measures

[21] Enhancement assumes effective management of the community trust

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

- The KGLM should liaise with the proponents of other renewable energy projects in the area to investigate how best the Community Trusts can be established and managed so as to promote and support local, socio-economic development in the region as a whole.
- The KGLM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the KGLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager.
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;
- Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the SEF plant.

4.4.4 Visual impact and impact on sense of place

The components associated with the grid infrastructure, specifically the transmission lines (internal and external) have the potential to impact on the areas current, rural sense of the place. However, as indicated above, the visual quality of the area has been impacted by an existing Eskom transmission line, transmission lines associated with other SEFs 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 addition, the site is located within the Upington Solar REDZ. The area has therefore been identified as suitable for the establishment of large solar energy facilities, including the associated grid infrastructure.

Table 4.11: 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.

4.4.5 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 PVs on the tourism potential of the area and the broader KGLM and NCP is therefore likely to be low.

Table 4.12: 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 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 and associated grid infrastructure 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 4.13: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of 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.

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The establishment of the proposed grid infrastructure for the proposed Geel Kop and other renewable energy facilities in the KGLM will place pressure on local services in nearby towns, such as Keimoes and Upington, specifically services such as medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction and operational phases of renewable energy projects proposed in the area, including the proposed grid infrastructure. The potential impact on local services can be mitigated by employing local community members. However, due to the low education and skills levels in the area there is likely to be a need to implement a training and skills development programme to ensure that local employment opportunities are maximised. The presence of non-local workers during both the construction and operation phase may also place pressure on property prices and rentals. As a result, local residents, such as government officials, such as municipal workers, school teachers, and the police, may no longer be able to buy or afford to rent accommodation in towns such as Keimoes and Upington.

However, as indicated below, this impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of a renewable energy hub in the area. These benefits will create opportunities for investment in Keimoes and the KHLM, including the opportunity to up-grade and expand existing services and the construction of new houses. In this regard the establishment of a renewable energy hub will create a unique opportunity for Keimoes and the KGLM to develop.

The Community Trusts associated with each project will generate revenue that can be used by the KGLM in consultation with the NC Provincial Government, to invest in up-grading local services where required. In should also be noted that it is the function of national, provincial and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the KGLM.

Table 4.14: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities in the KGLM and ZFMDM will place pressure on local services, specifically medical, education and accommodation		
	Without Mitigation	**With Mitigation[22]**
Extent	Local and regional (3)	Local and regional (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (52)	Low (28)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Negative impact on the local services		
Residual impacts: See cumulative impacts		

Comment on No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The Northern Cape Provincial Government, in consultation with the ZFMDM, KGLM and the proponents involved in the development of renewable energy projects in the GKLM, should consider establishing a Development Forum to co-ordinate and manage the

[22] The mitigation measures are linked to initiatives undertaken by Provincial and Local Government to address the additional demand for services and accommodation etc. created by the establishment of development renewable energy projects in the Upington Solar REDZ.

development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the KGLM and ZFMDM.

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of a renewable energy hub and associated grid infrastructure will create a number of socio-economic opportunities for the KGLM and ZFMDM, which, in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. In this regard the establishment of renewable energy facilities and the associated grid infrastructure in the area is strongly supported by the LED representatives from the KGLM.

The review of the REIPPPP (March 2019) indicates that R 860.1 million has been generated by socio-economic development contribution associated with the current 64 operational IPPs. This has been spent on education and skills development (40.9%), followed by enterprise development (24.2%), social welfare (21.3%), general administration (9%) and health care (4.5%). In terms of education, the IPPs have supported 1 044 education institutions, with a total spend of R 236.7 million between 2015 and March 2018. It is estimated that these contributions have benefitted in the region of 375 737 learners. In addition, enterprise development contributions committed for BW1 to BW4, 1S2 and 2S2 amount to R7.2 billion. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of March 2019 a total of R 254.3 million had already been made to the local communities located in the vicinity of the 64 operating IPPs.

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and extend over a period of 20-25 years. The representatives from the KGLM indicated that due the limited opportunities in the 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.

Table 4.15: Cumulative impacts on local economy

Nature: The establishment of a number of solar energy facilities in the KGLM and ZFMDM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (3)	Local and regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (44)	High (70)
Status	Positive	Positive
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement: See below		
Cumulative impacts: Positive impact on the local and regional economy through the creation of downstream opportunities and wage spend in the local economy		
Residual impacts: See cumulative impacts		

Assessment of No-Go option

There is no impact as it maintains the current status quo. This would represent a lost socio-economic opportunity for the KGLM.

Recommended mitigation measures

The proposed establishment of suitably sited renewable energy facilities and associated grid connections within the KGLM and NCP should be supported.

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

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

Table 4.16: 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[23]**
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.

[23] Assumes establishment of a Community Trust

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 on-site substations associated with each of the seven PVs will have no bearing on the nature and significance of the social impacts associated with the transmission line. The substations have therefore not been assessed.

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 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 study area is also located within the Upington REDZ, which was formally gazetted in 2018[24]. The area has therefore been identified as suitable for the establishment of renewable energy facilities and the associated grid connection infrastructure.

[24] GN 113 and GN114 of 2018

5.2.2 Construction phase impacts

The key social issues associated with the construction phase include:

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

The construction phase will extend over a period of approximately 12 months and create in the region of 130 employment opportunities. The total wage bill will be in the region of R 20 million (2020 Rand values). Most of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to local residents in the area, specifically residents from local settlements, such as Brugge, Klippunt, Dyasons Klip, Oranjevallei, Louisvale, Kanoneiland, Bloemsmond, Curriescamp and Soverby,. The majority of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities. A percentage of the wage bill 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 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 (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)

5.2.3 Operational phase impacts

It is important to recognise that the benefits associated with renewable energy projects, such as the seven proposed SEFs located on Geel Kop Farm, are dependent upon being able to connect to the national grid.

The key social issues associated with the operational phase include:

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

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. The potential negative impacts can therefore be effectively mitigated.

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
Establishment of infrastructure to support renewable energy	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Low (Positive)
Benefits associated with Community Trust	Medium (Positive)	High (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 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 Solar 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. 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 significance of this impact with mitigation was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **High Positive**.

5.2.5 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 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.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The development of the grid connection infrastructure is integral to the development and success of the renewable energy programme. The benefits associated with the seven proposed SEFs located on Geel Kop Farm are therefore dependent upon being able to connect to the national grid via the establishment of the grid connection infrastructure.

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 are **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The establishment of the grid connection infrastructure linking the seven proposed PVs located on RE Geel Kop Farm No 456 to the ESKOM Upington MTS is therefore supported by the findings of the SIA. The grid connection infrastructure is also located within the Upington Solar 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.

ANNEXURE A

INTERVIEWS

- Fienies, Cllr (2020-03-01). Ward 8 Cllr, Kai !Garib Local Municipality.
- Regenstein, Mr SW (2020-03-01). Geelkop Farm (Regenstein).
- Snyman, Mr Francois (2020-03-01). RE Geel Kop Farm No 456.
- Snyman, Mr Willie (2020-03-02). Bloemsmond Farm.
- Theron, Mr Francois (2020-03-02). Karstens Group livestock farms manager.
- Theunissen, Mr Jaco (2020-03-01). Daysonsklip Farm.
- Van Rooyen, Mr Leonard (2020-03-01). Chairman, Blocuso Trust.

The following representatives from the Kai !Garib Local Municipality were interviewed in 2016 and 2019 as part of SIAs for a SEF located near Kenhardt and the Bloemsmond SEF:

- 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;
- 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;

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.

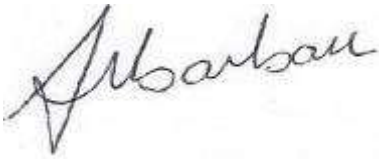
ANNEXURE D: DECLARATION OF INDEPENDENCE

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):

3 April 2020

Date: