SOCIAL IMPACT ASSESSMENT

GREAT KAROO ELECTRICAL GRID INFRASTRUCTURE

NORTHERN CAPE PROVINCE

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Prepared

By

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Savannah Environmental was appointed to manage the Basic Assessment (BA) process for Great Karoo Electrical Grid Infrastructure (EGI), which comprises a 132kV central collector substation and a 132kV double circuit power line. The development is proposed on a site located approximately 30-35 km west of the town of Richmond in the Northern Cape Province. The project site is situated within the Ubuntu Local Municipality (ULM), which is located within the Pixley Ka Seme District Municipality (PKSDM). The entire extent of the site falls within the Central Corridor of the Strategic Transmission Corridors. A single corridor alignment has been identified for the assessment. Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of the BA process.

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.

POLICY AND PLANNING ISSUES

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy and associated energy distribution infrastructure is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The proposed grid connection infrastructure is also located within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of grid infrastructure. The development of the proposed Great Karoo EGI is therefore supported by key policy and planning documents.

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 12-18 months and create in the region of 50 employment opportunities. The total wage bill will be in the region of R 2-2.5 million (2022 Rand values). Most of the low and semi-skilled employment opportunities are likely to benefit residents from local towns in the area, including Richmond

and Victoria West. Most the beneficiaries are likely to be HD members of the community. This would represent a short term 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 UM. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. The proponent should therefore commit to employing as many local community members as possible.

The capital expenditure associated with the construction of the grid connection infrastructure will be ~110 million (2022 Rand values) and will create opportunities for the local and regional and local economy. The sector of the local economy 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. However, given the relatively small scale of the development and short construction period the benefits will be limited.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risk of veld fires.
- Risks posed to farming activities by construction workers.

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the construction of the grid connection infrastructure 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	Low (Positive)	Moderate (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative)	Low (Negative)
Impact of construction activities and vehicles	Low (Negative)	Low (Negative)
Risk of veld fires	Moderate Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Moderate Negative)	Low (Negative)

OPERATIONAL PHASE

The benefits associated with the Great Karoo Renewable Energy Cluster are dependent upon these facilities being able to connect to the national grid. The key social issues associated with the operational phase include:

Potential positive impacts
- Improved energy security and establishment of energy infrastructure.
- Creation of employment, skills development, and local procurement opportunities.
- Generate income for landowners.

Potential negative impacts
- The visual impacts and associated impact on sense of place.
- Risks posed to farming activities by maintenance workers.

The findings of the SIA indicate that the significance of the potential negative impacts is likely be **Low Negative** if the required mitigation measures are effectively implemented.

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

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation / Enhancement	Significance With Mitigation / Enhancement
Improve energy security and establishment of energy infrastructure	Medium (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Moderate (Positive)
Generate income for landowners	Low (Positive)	Moderate (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Risk to farming operations during maintenance	Low (Negative)	Low (Negative)

CUMULATIVE IMPACTS

The study area is traversed by several existing Eskom transmission lines associated with the Gamma substation. The potential for cumulative impacts associated with the 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 cumulative impact on the areas sense of place is likely to be low. None of the affected property owners interviewed identified visual impacts as a concern. The area also falls within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of the grid infrastructure.

NO-DEVELOPMENT OPTION

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

CONCLUSIONS AND RECOMMENDATIONS

The energy security benefits associated with the proposed Great Karoo Renewable Energy Cluster are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed grid connection are ***Low Negative*** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The alignment was also regarded as acceptable by affected landowners interviewed.

The power line is also located within the Central Transmission Corridor. The establishment of proposed Great Karoo Electrical Grid Infrastructure (EGI) is therefore supported by the findings of the SIA.

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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 1.5, Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.6, Annexure B
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3,
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Interviews in 2021 (Annexure A)
(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, Annexure B
(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, Section 5,
(g) an identification of any areas to be avoided, including buffers;	Section 4
(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
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.4,
(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, Section 5
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(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
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	Annexure A, lists key stakeholders interviewed
(p) 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
(q) 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.	Comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette

	43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. As at September 2020, there are no sensitivity layers on the Screening Tool for Socio-economic- features. Part A has therefore not been compiled for this assessment.

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
ULM	Ubuntu Local Municipality
IDP	Integrated Development Plan
IPP	Independent Power Producer
PKSDM	Pixley Ka Seme District Municipality
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
WEF	Wind Energy Facility
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Savannah Environmental was appointed to manage the Basic Assessment (BA) process for Great Karoo Electrical Grid Infrastructure (EGI), which comprises a 132kV central collector substation and a 132kV double circuit power line. The development is proposed on a site located approximately 30-35 km west of the town of Richmond in the Northern Cape Province. The project site is situated within the Ubuntu Local Municipality (ULM), which is located within the Pixley Ka Seme District Municipality (PKSDM). The entire extent of the site falls within the Central Corridor of the Strategic Transmission Corridors. A single corridor alignment has been identified for the assessment. Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of the BA process.

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Figure 1.1: Location of Great Karoo Electrical Grid Infrastructure (Red Arrow)

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 development.
- Identification and description of the potential social issues associated with the proposed development.
- Assessing and documenting the significance of social impacts associated with the proposed project.
- Identification of potential enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

1.3 PROJECT DESCRIPTION

Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a 132kV central collector substation and a 132kV double circuit power line on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province. The collector substation that comprises both the Eskom switching station and the IPP's substation is proposed on Portions 0 and 1 of Farm Rondavel 85. One grid corridor has been considered for assessment and placement of the 132kV double circuit power line.

- Portion 0 of Farm Annex Rondavel 86.
- Portion 1of Farm Uit Vlugt Fontein 265.
- Portion 0 of Farm Wynandsfontein 91.
- Portion 1 of Farm Wynandsfontein 91.
- Portion 3 of Farm Vlekfontein 90.
- Portion 0 of Farm Burgersfontein 92.
- Portion 0 of Farm Nieuwe Fontein 89.
- Portion 1 of Farm Nieuwe Fontein 89.
- Portion 0 of Farm Rondavel 85.
- Portion 1 of Farm Rondavel 85.
- Portion 0 of Farm Kleinfontein 93.
- Portion 1 of Farm Bult & Rietfontein 96.
- Remaining extent of Portion 3 of Farm Schietkuil.

The development of the 132kV central collector substation and 132kV power line is required to enable the connection for the Great Karoo Cluster of Renewable Energy Facilities, which comprises three (3) 100MW solar photovoltaic (PV) energy facilities, and two (2) 140MW wind farms, to the national grid for the evacuation of the generated electricity. The connection point into the national grid will be the existing Eskom Gamma Substation.The projects which the proposed grid connection infrastructure will facilitate the grid connection for are known as:

- Angora Wind Farm.
- Merino Wind Farm.
- Nku Solar PV Energy Facility.
- Moriri Solar PV Energy Facility.
- Kwana Solar PV Energy Facility.

The entire extent of the site falls within the Central Corridor of the Strategic Transmission Corridors. The grid connection infrastructure is known as the Great Karoo Electrical Grid Infrastructure (EGI). Details of the proposed grid connection infrastructure is provided in the Table 1.1 below. The alignment is illustrated in Figure 1.2.

As indicated in Figure 1.2, the alignment runs from the Gamma substation in the south west to the collector substation in the north east over a distance of ~ 37.95 km. Option 1 is located ~ 4.5 km north of the N1 for most its length and the majority of the alignment is visually screened from the N1 by the natural topography.

Table 1.1: Summary of project details

Corridor width (for assessment purposes)	One grid connection corridor has been identified for the assessment and placement of the grid connection infrastructure. The grid connection corridor comprises a 1km wide power line corridor to allow for avoidance of environmental sensitivities, and suitable placement within the identified preferred corridor. Therefore, the entire corridor is being proposed for the development provided the infrastructure remains within the assessed corridor and environmental sensitivities within this corridor are avoided.
Power line capacity	580MVA at 132kV (double-circuit)
Tower height	Up to 32m
Power line servitude width	Up to 40m
Length of power line corridor	Collector Sub – Gamma **~** 37.5km
Development footprint of the Collector Substation (including the Eskom switching station)	1000mx700m
Capacity of the Collector Substation	580MVA at 132kV

Figure 1.2: Alignment of grid connection

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.
- 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 visit and interviews with key stakeholders.
- 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.

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 the proposed transmission line.

Strategic importance of the project
The Great Karoo EGI will serve as a grid connection solution for the Great Karoo Cluster of Renewable Energy Facilities. The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies. The site is also located within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of transmission lines and grid related 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. The site is also located within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of transmission lines and grid related infrastructure.

1.5.2 Limitations

Demographic data
Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

1.6 SPECIALIST DETAILS

Tony Barbour, the lead author of this report, is an independent specialist with 28 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 260 SIAs 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 Tony Barbour's CV.

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 over the last seventeen years.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Schalk van der Merwe, the specialist's consultant responsible for undertaking the study and preparing the Scoping Level SIA Report, are independent and do not have a vested or financial interest 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
- Section 2: Summary of key policy and planning documents relating to renewable 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[1]" 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. Furthermore, it also constitutes a key reporting requirement in terms of the applicable Western Cape Department of Environmental Affairs and Development Planning's *Guidelines for Social Impact Assessment* (2007).

The proposed grid connection infrastructure is linked to the proposed Great Karoo Renewable Energy Cluster. The review therefore includes reference to key policy documents that have a bearing on renewable energy. At the local level the focus of the review has been on Provincial and Local Municipal level policy and planning documents.

- The National Development Plan (2011).
- The New Growth Framework (2010).
- The National Infrastructure Plan (2012).
- The Integrated Energy Plan (1998).
- 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).
- Pixley ka Seme District Municipality Integrated Development Plan (2019-2020).
- Pixley ka Seme District Municipality Spatial Development Framework (2017).
- Ubuntu Local Municipality Integrated Development Plan (2019-2020).

2.2 NATIONAL DEVELOPMENT PLAN

The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development.

Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on

[1] "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.

options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green, low-carbon economy, is one of these challenges.

In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place.

Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted.

The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role.

2.3 NEW GROWTH PATH FRAMEWORK

Government released the New Economic Growth Path_Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. 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.

2.4 NATIONAL INFRASTRUCTURE PLAN

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

construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools, and dams will contribute to improved economic growth.

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

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

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

SIP 8: Green energy in support of the South African economy
- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010).

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.

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.

2.5 INTEGRATED ENERGY PLAN

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 are identified, namely:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.

- Objective 7: Promote energy efficiency in the economy.
- 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 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.

2.6 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, 2015) identified eight (8) Renewable Energy Development Zones (REDZs) (Phase 1 REDZs) and five (5) Transmission Corridors. The REDZs identified areas where large scale wind 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. On 17 February 2016, the Cabinet of the Republic of South Africa (Cabinet) approved the gazetting of Renewable Energy Development Zones (REDZs) and Transmission Corridors. On 26 February 2021, Minister Barbara Dallas Creecy, published Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 which identified 3 additional REDZs (Phase 2 REDZs) for implementation as well as the procedures to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large-scale wind and solar photovoltaic energy facilities in these REDZs. The proposed grid connection is located within the Central Transmission Corridor (Figure 2.1).

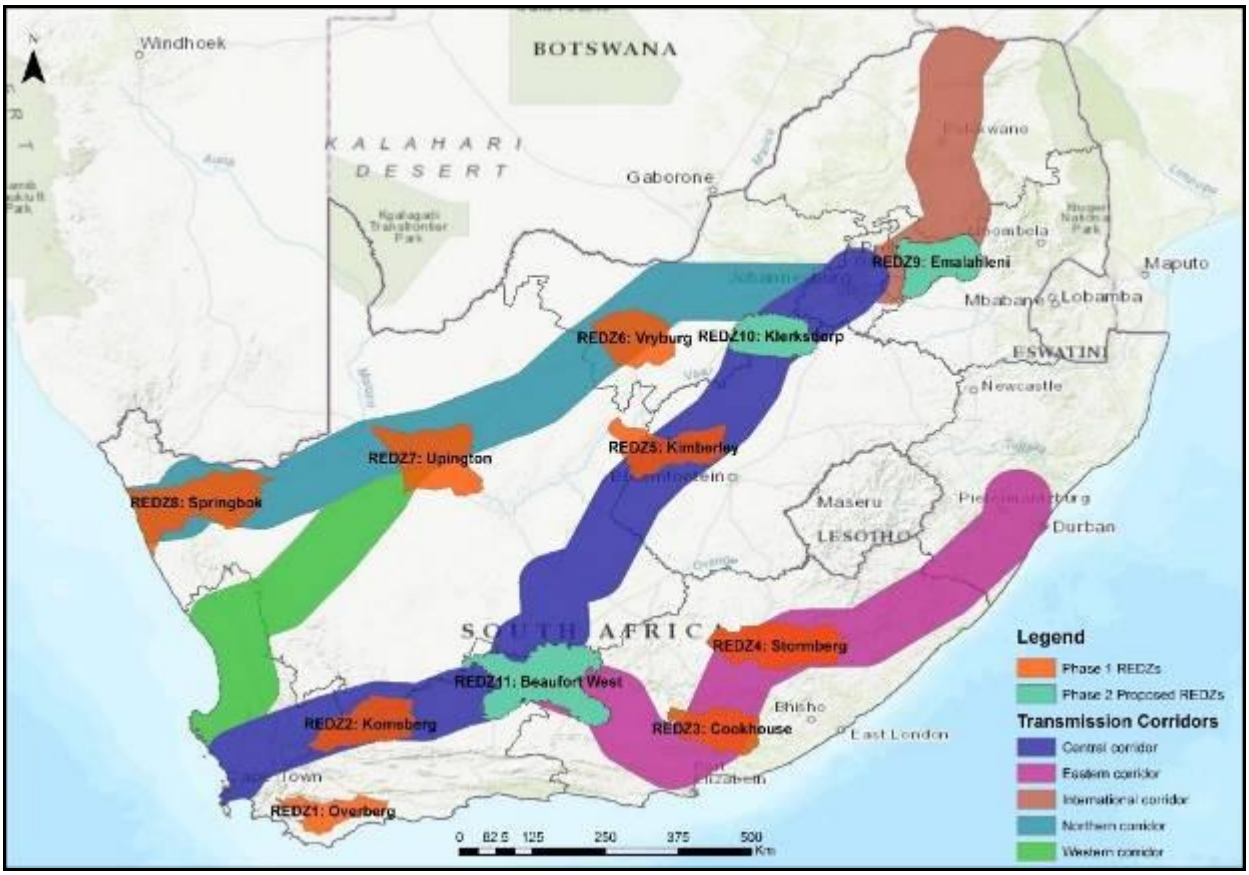


Figure 2.1: Location of Renewable Development Zones and Transmission Corridors in South Africa *(Source CSIR)*

2.7 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 level 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 development and associated 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.

2.8 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).

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

- 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.
- 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.

2.9 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.

2.10 NORTHERN CAPE PROVINCE GREEN DOCUMENT

The NCP Green Document (2017-2018) 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.
- Insufficient support from local municipalities for IPP development.

2.11 PIXLEY KA SEME DISTRICT MUNICIPALITY INTEGRATED DEVELOPMENT PLAN

The vision for the PKSDM is "Developed and Sustainable District for Future Generations"

To mission statement that underpins the vision is:

- Supporting our local municipalities to create a home for all in our towns, settlements, and rural areas to render dedicated services.
- Providing political and administrative leadership and direction in the development planning process.
- Promoting economic growth that is shared across and within communities.
- Promoting and enhancing integrated development planning in the operations of our municipalities.
- Aligning development initiatives in the district to the National Development Plan.

The Strategic Objectives to address the vision that are relevant to the project includes the promotion of economic growth in the district and enhance service delivery. Chapter 4, Development of Strategies, highlights the key strategies of the PKSDM. The promotion of economic development is the most relevant strategy for the project. The IDP also notes that the growth and development context in the district has also changed radically since 2013 (after it had been stagnant for decades) owing mainly to private and public investments in the area as a hub for renewable energy generation and astronomy.

The IDP notes that the economy in the Pixley ka Seme municipal area is characterized by:

- High levels of poverty and low levels of education.
- Low levels of development despite the strategic location in terms of the national transport corridors.
- High rate of unemployment, poverty and social grant dependence.
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts).

Of specific relevance the IDP highlights the potential for renewable energy to help address some of these challenges.

2.12 PIXLEY KA SEME DISTRICT MUNICIPALITY SPATIAL DEVELOPMENT FRAMEWORK

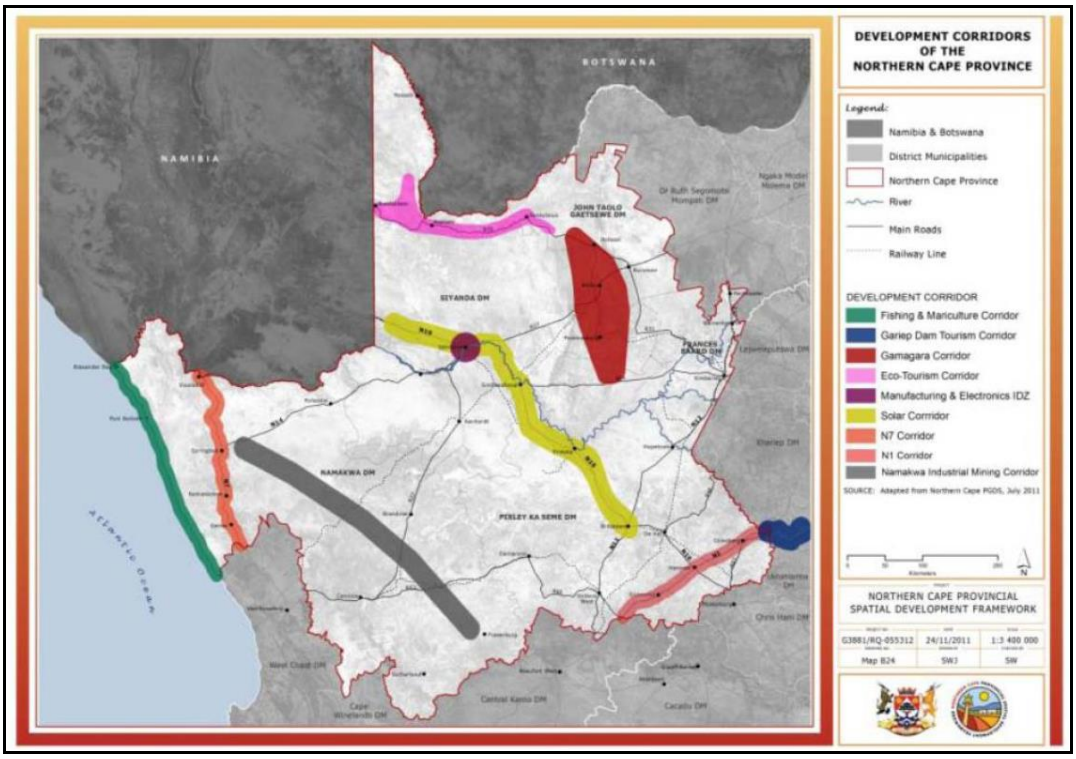
The SDF notes that the vision for the PKSDM is "Pixley Ka Seme DM, pioneers of development, a home and future for all". The Mission Statement that underpins the vision refers to:

- Effective and efficient service delivery.
- Optimal human and natural resource development.
- Local economic growth and development, job creation and poverty alleviation.
- A vibrant tourism industry.
- To participate in the fight to reduce the infection rate and lessen the impact of HIV/ Aids and other communicable diseases.
- A safe, secure and community friendly environment.

The SDF identifies the opportunities and constraints associated with the district. Of relevance to the project the opportunities include:

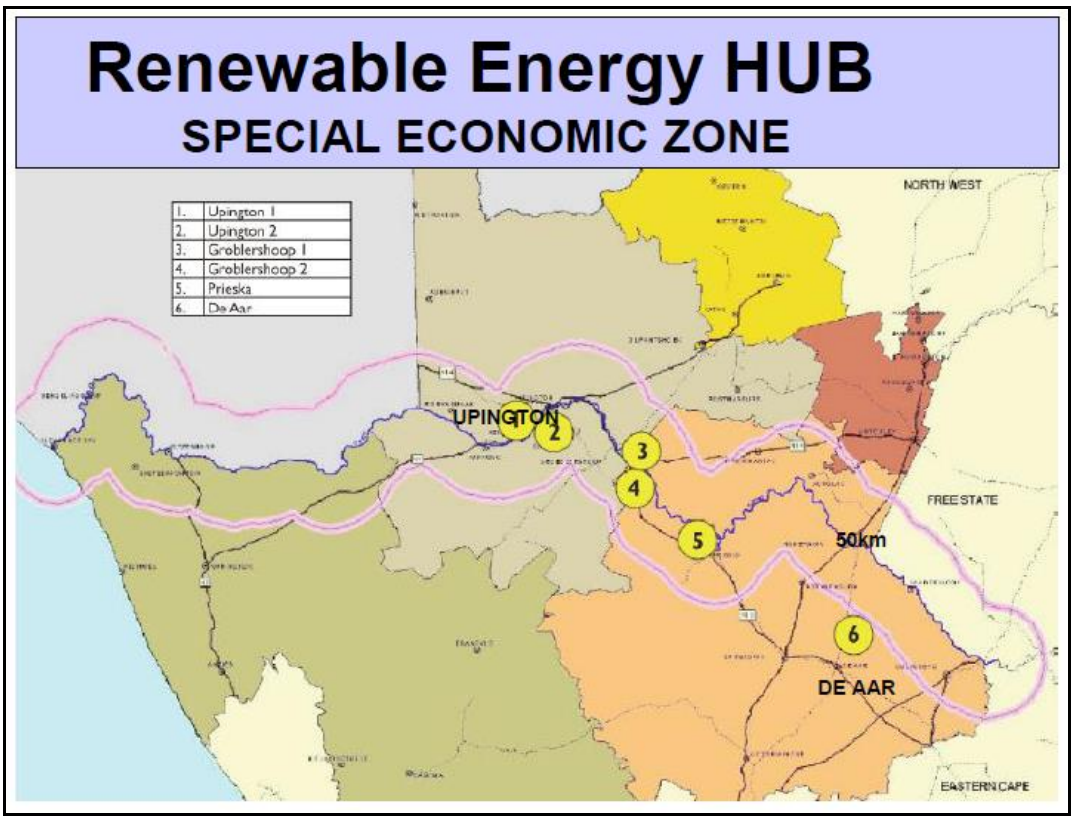
Renewable Energy and the identification of a renewable energy hub in the region. The natural environment and maintenance and conservation of the pristine natural environment to support sustainable farming into the future is also identified as an opportunity. The SDF notes that Pixley Ka Seme District area with its abundance of sunshine and vast tracts of available land has attracted considerable interest from solar energy investors. The high solar index of the area provides many opportunities in terms of the development of renewable energy. This has been acknowledged by the Northern Cape Government with the identification of the Renewable Energy Hub. The areas around the northern and eastern borders of the Pixley Ka Seme District Municipality form part of this hub with the potential to stimulate special economic development zoned within the area that have the potential to stimulate industrial development.

The PKSDM also falls within the Solar Development Corridor as identified in the Northern Cape Provincial Spatial Development Framework. The corridor extends from Kakamas to Upington and down to De Aar in the south-east (Figure 2.2). Section 5.6.1 of the SDF also refers to the establishment of a Renewable Energy Hub proposed for the Northern Cape stretching from the west coast right up to the De Aar region (Figure 2.3). The Hub can accommodate special economic development within the zone as earmarked and entails a 100km wide zone. The proposed project is located outside corridor and proposed hub. However, this does not imply that the area is not suitable for the establishment of solar energy facilities.



Source: Northern Cape SDF

Figure 2.2: Northern Cape Development Corridors-Solar Corridor (yellow)



Source: Northern PKSDM SDF

Figure 2.3: Northern Cape Renewable Energy Hub

The SDF does however also note that the area is known for its clean air and open skies with limited light pollution. Potential visual impacts are therefore an issue that needs to be considered.

In this regard the SDF notes that the topography of Pixley Ka Seme region is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances. This asset makes for excellent scenic drives throughout the whole of the region from the flat plains to crossing the main rivers of South Africa. Visual vistas, ridges and "koppies" are assets within the region and they must be handled with sensitivity.

The relevant constraints include high levels of poverty and unemployment, backlog in basic services, including electricity and housing in rural areas, the limited supply of water and overall scarcity of water in the region to support economic development.

The development challenges that face the Pixley Ka Seme District Municipality include high unemployment and poverty rates and low income which are placing increasing demand on service delivery because very few people are able to pay for services. Declining population numbers, and alcohol and substance abuse are also key challenges.

In terms of services, inadequate schools in farming areas results in children having to travel long distances to areas where the go to school. There are also insufficient health centres and lack of amenities and recreational services. Where these services do exist, they are often poorly managed and maintained. The level of key services, such as refuse removal, are also low, while many rural and a number of urban households rely on boreholes for their water supply.

Climate change is also identified as a key risk. The SDF notes that the Karoo is predicted to experience more drought periods, coupled with increased evaporation and temperatures and this will negatively impact already restricted water supply. It is likely that the greatest impacts will be on water supply.

2.13 UBUNTU LOCAL MUNICIPALITY INTEGRATED DEVELOPMENT PLAN

The vision of ULM is "By 2030, Ubuntu Municipality shall be the best rural municipality through relentless pursuit of excellence through focused governance, efficient administration, and effective service delivery for inclusive targeted social and economic development against all odds".

The mission is to:

- Maximize the utility of the municipal resources in a sustainable, developmental, and economic manner to better the life of all.
- Improve institutional effectiveness and efficiency.
- Optimally develop our human, financial and natural resources.
- Create an enabling environment for local economic growth in order to create employment opportunities and alleviate poverty.
- Work with all our existing and prospective partners to establish a vibrant tourism industry.
- Participate in the fight to reduce the HIV/AIDS infection rate and lessen the impact thereof.

- Focus on youth development, women empowerment and enabling the disabled to play a meaningful role in unlocking human potential.
- Ensure a safe, secure and community friendly environment.
- Maintain sound and sustainable management of financial and fiscal affairs.

Based on the 2011 Census data the largest town in the ULM was Victoria West with a population of 7 611, followed by Richmond (2 841) and Loxton (921). Key issues facing the municipality include:

- High level of illiteracy.
- Poverty and unemployment.
- Limited educational facilities

The IDP identifies a number of challenges facing the area in terms of economic development and growth. Of relevance to the project these include:

- Unemployment and poverty.
- Shortage of critical skills
- Needs of vulnerable groups, including women, disabled and youth.
- Access to basic services such as water, sanitation, electricity and housing.
- Improved access to services in education, health and social services.
- Reduction in the rate of crime.

The key sectors in the local economy agriculture is the key economic sector. Livestock and game form the nucleus of farming activities, with limited crop farming. Livestock farming mainly comprises of sheep, goat and cattle. The main agricultural products are wool for the export market and meat for the local market. Biltong and hunting are the major products of game farming. Game biltong is produced at and exported from a factory in Victoria West.

Chapter 3 of the IDP outlines the development strategies for the ULM. The IDP strategies are aligned with the National Key Performance Areas (KPAs). The KPAs that are relevant to the project include:

- KPA 1: Basic Service Delivery and Infrastructure Development

The strategic objectives under KPA 1 include the provision of sustainable basic services.

- KPA 2: Local Economic Development

The strategic objectives under KPA 1 include investment acceleration and attraction, including a focus on private sector investment, promotion of SMMEs, agriculture, tourism and the development of an industrial and commercial economic zone.

In terms of Ward 3, the following challenges and needs were identified as part of the IDP process.

- High unemployment and poverty rates.
- Need for a youth centre.
- Need to upgrade firefighting services.
- Illegal dumping.

These issues can be addressed by SED and ED spend linked to the project.

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 Ubuntu Local Municipality (ULM), which forms part of the Pixley Ka Seme District Municipality (PKSDM) (Figure 3.1). The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Renosterberg, Ubuntu, Siyancuma and Umsobomvu municipalities (Figure 3.2). The town of Victoria West is the administrative seat of the ULM. The project area is located in Ward 3 of the ULM.

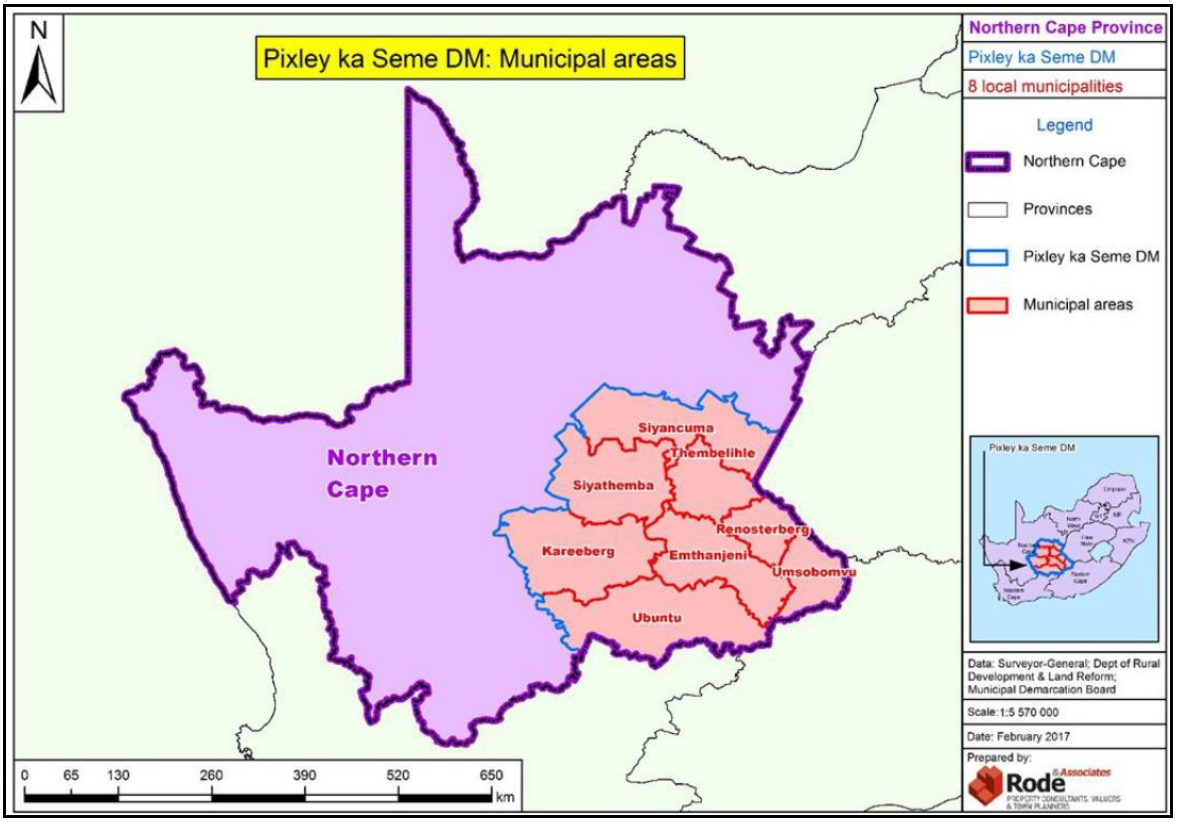


Figure 3.1: Location of Pixley Ka Seme District Municipality within the Northern Cape Province

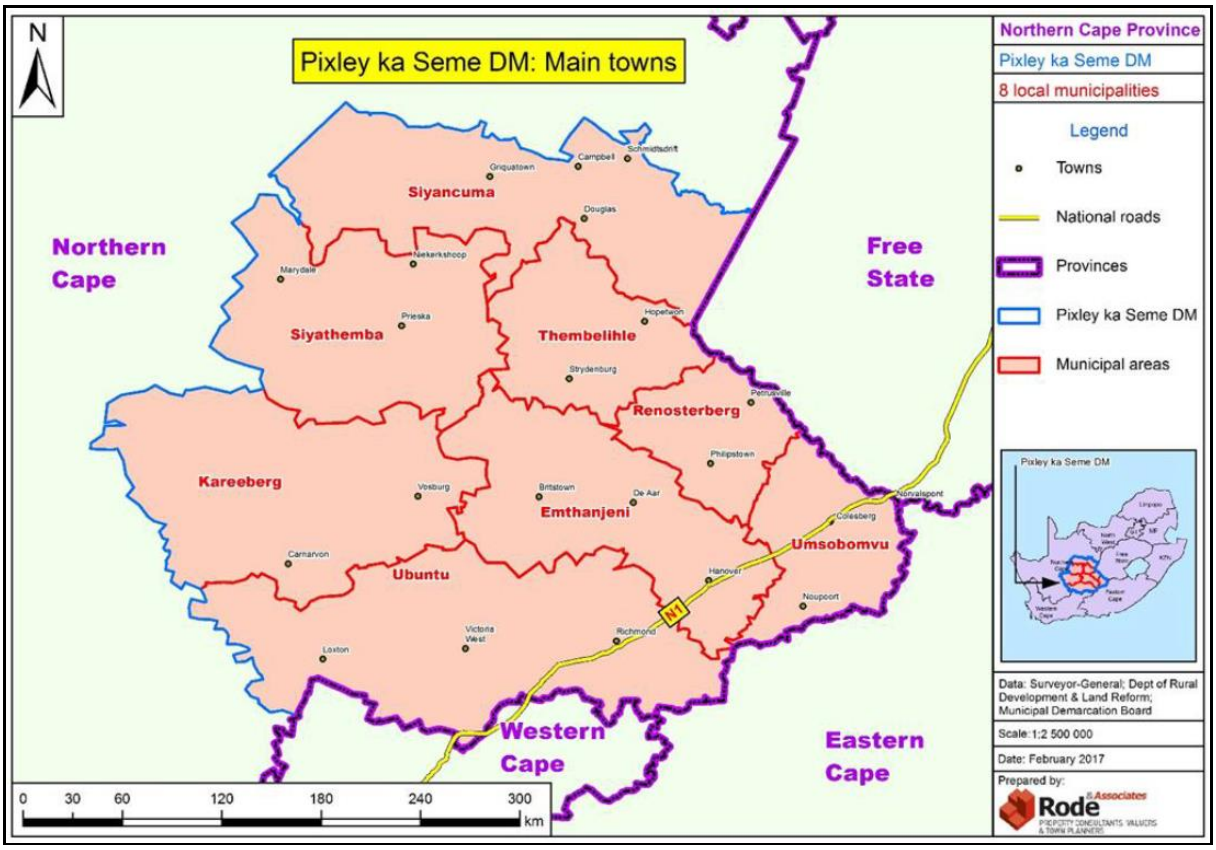


Figure 3.2: Location of Ubuntu Local Municipality within the Pixley Ka Seme District Municipality

3.3 PROVINCIAL CONTEXT2

The proposed site 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, Pixley Ka Seme and ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM). The site itself is located in the Pixley Ka Seme DM.

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

2 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.

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).

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 living3. 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 3.3). 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

3 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.

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.

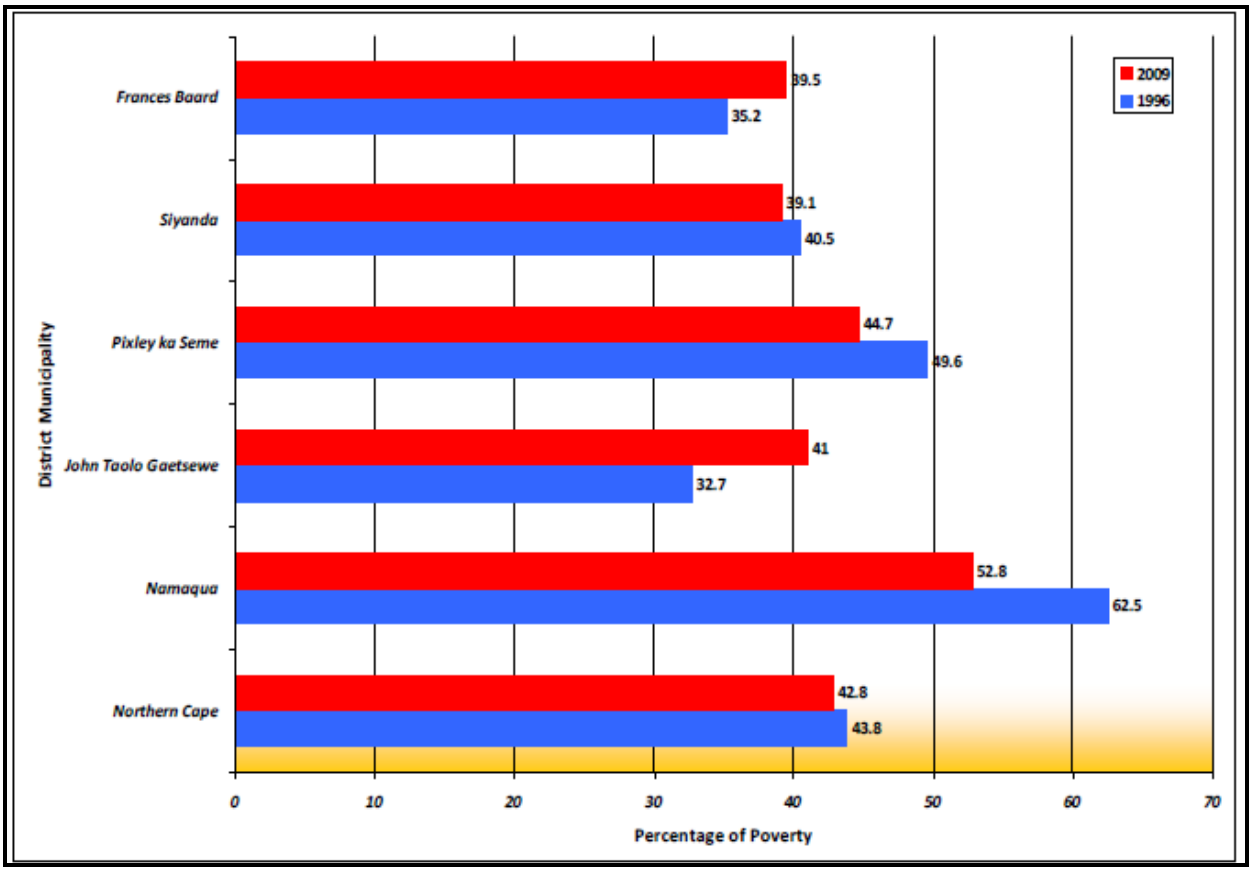


Figure 3.3: Percentage of people living in poverty in the Northern Cape (Source: Global Insight, 2009 as cited in the PGDS, July 2011)4.

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 used5.

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

4 Siyanda DM is now called the ZF Mgcawu DM.

5 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 for an individual or R 3 200 per month for a household of four.

the smallest contributing province to South Africa's economy (only 2% to South Africa GDP per region in 2007).

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

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

The main agricultural produce of the Northern Cape include:

- High-value horticultural products such as table grapes, sultanas and wine grapes, dates, nuts, cotton, fodder, and cereal crops are grown along the Orange River.
- Wheat, fruit, groundnuts, 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).

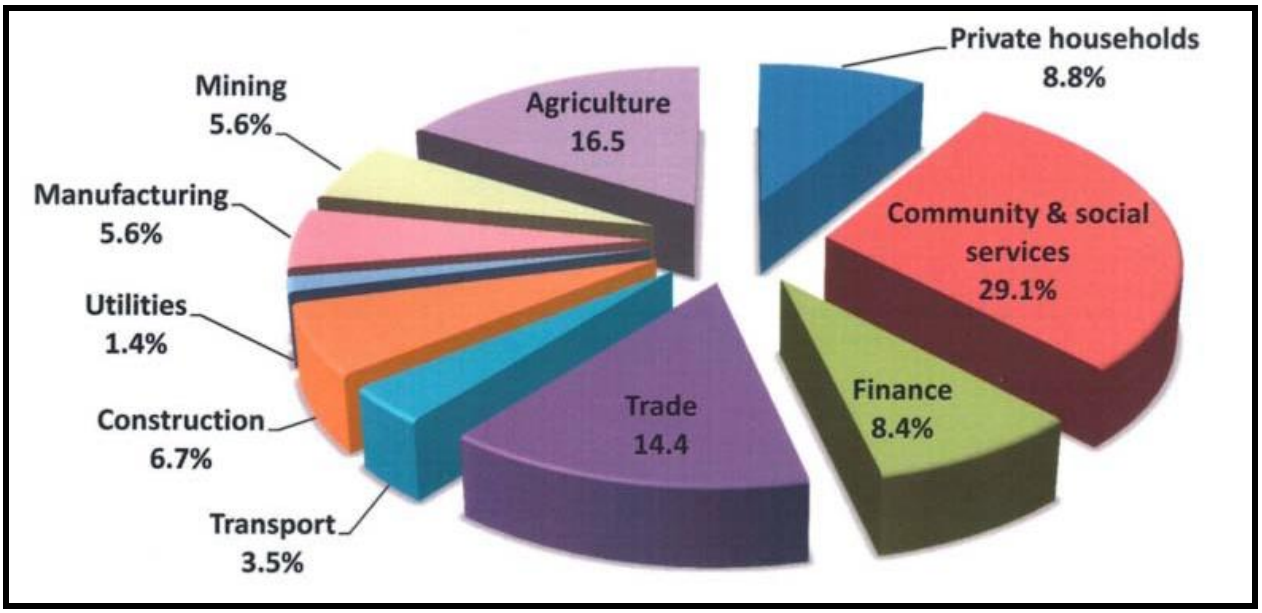


Figure 3.4: Employment by Economic Sector and Industry (Source: Statistics South Africa 2012).

3.4 DEMOGRAPHIC OVERVIEW

Population

The population of the ULM in 2016 was 19 471 (Community Household Survey 2016). Of this total, 38.6% were under the age of 18, 55.9% were between 18 and 64, and the remaining 5.5% were 65 and older. The population of Ward 3 in 2011 was 4 715. Of this total, 37% were under the age of 18, 58% were between 18 and 64, and the remaining 5% were 65 and older. The ULM and Ward 3 therefore have a high percentage of the population that fall within the economically active group of 18-65. The figures are similar to the figures for the PKSDM and Northern Cape (58.5% and 57.7% respectively).

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, while the Northern Cape Province was 55.7%. The high provincial dependency ratio is also reflected at a local municipal and ward level. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the ULM (2016) and Ward 3 (2011) were 79% and 72% respectively. Based on this approach the figures are similar to the figure for the Northern Cape (73.3%). The high dependency ratios reflect the limited employment and economic opportunities in the area.

In terms of race groups, Coloureds made up 73% of the population on the ULM, followed by Black Africans, 22.5% and Whites, 4.5%. In Ward 3, Coloureds made up 77.3% of the population, followed by Whites, 14.8% and Black Africans, 6.7The main first language spoken in both the ULM and Ward 3 was Afrikaans, 82.5% and 92.5% respectively.

Households and house types

There were a total number of 6 034 (2016) and 1 609 (2011) households in the ULM respectively. Of these 90.4% (ULM) and 92.4% (Ward 7) were formal houses. 6.6% of the structures in the ULM and 1.2% in Ward 3 were shacks. The majority of dwellings in the ULM and Ward 3 are therefore formal structures. The majority of the properties in the ULM (59.2%) were owned and fully paid off. In Ward 3 the majority of properties were occupied rent free. This figure reflects the rural nature of Ward 3 and the rent-free status of farm workers. Approximately 33.6% of the households in the ULM and 18.8% of the households in Ward 3 were headed by women. These figures are lower than the rate for the PKSDM (37%) and Northern Cape (39%). Despite the figures for the ULM being lower than the district and provincial averages, women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 11.7% of the population of the ULM had no formal income, 3.6% earned less than R 4 800, 6.2% earned between R 5 000 and R 10 000 per annum, 24.1% between R 10 000 and R 20 000 per annum and 24% between R 20 000 and 40 000 per annum (2016). For Ward 3, 5.9% of the population had no formal income, 2.5% earned less than R 4 800, 5.1% earned between R 5 000 and R 10 000 per annum, 30.9% between R 10 000 and 20 000 per annum and 29% between R 20 000 and 40 000 per annum (Census 2011).

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 (~ 40 000 per annum). Based on this measure, in the region of 69.6% of the households in the ULM and 73.4% in Ward 3 live close to or below the poverty line. The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside in the area. This is also reflected in the high unemployment rates. 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 ULM. This in turn impacts on the ability of the ULM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the ULM and Ward 3 that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment

The official unemployment rate in the ULM in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 in 2011 were 6.8% unemployed, 62.5% employed and 28.4% not economically active. The unemployment rates for the ULM and Ward 3 are lower than the Provincial rate of 14.5% and the District rate of 14.8%. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the ULM and Ward 3. Recent figures released

by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education
In terms of education levels, the percentage of the population over 20 years of age in the ULM and Ward 3 with no schooling was 11.8% (2016) and 20.7% (2011) respectively, compared to 7.9% and 11.1% for the Northern Cape Province in 2016 and 2011 respectively. The percentage of the population over the age of 20 with matric was 23.2% and 15.6% respectively, compared to 29.1% (2016) and 25.2% (2011) for the Northern Cape. The lower education levels are linked to rural, isolated nature of the area.

3.5 MUNICIPAL SERVICES

Electricity
Based on 2016 survey, 84.7% of households in the ULM had in-house prepaid meters, while 6.6% had no access to electricity. No data was on electricity access was available for Ward 3.

Access to water
Based on the 2016 survey information, 89% of households in the ULM were supplied by a service provider, while 9.8% relied on their own sources. For Ward 3, 56% of households relied on boreholes, while 31.1% were provided with water by a local service provider and 6% from tankers (2011). This high reliance on boreholes reflects the rural nature on Ward 3.

Sanitation
87.6% of the households in the ULM had access to flush toilets (2016), while 4.1% relied on bucket toilets and 5.8% did not have access to formal sanitation. In Ward 3, only 55.7% of the households had access to flush toilets, while 15.4% relied on pit latrines and 21.7% had no form of formal sanitation (2011). The high percentage of households with no formal form of sanitation reflects the rural nature of Ward 3.

Refuse collection
82.6% of the households in the ULM had access to regular refuse removal service, while 7.5% disposed of their waste at their own dump and 5.1% used communal dumps (2016). In Ward 3, 20.4% of households had access to regular refuse removal service, 56.2% disposed of their waste at their own dump and 17.6% had not access to refuse removal services (2011). The lower figures for Ward 3 reflect the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns in the area.

3.6 HEALTH, COMMUNITY AND SAFETY FACILITIES

In terms of health care facilities, there is a hospital and clinic in Victoria West and Richmond, and also a clinic in Loxton (Table 3.1). The key issues facing the health services in the area include:

- Inadequate health facilities.
- Limited medical staff (Doctors & Nurses).
- Limited equipment.
- Shortage of ambulances

Table 3.1: Health Facilities in ULM

Health Facilities	Clinic	Hospital	Ambulance Facilities
Victoria West	1	1	Yes
Richmond	1	1	Yes
Loxton	1	0	0
Hutchinson	0	0	0
Merriman	0	0	0
Total	**3**	**2**	**2**

The public facilities include libraries in all of the towns, except Merriman. There are also community halls in the larger towns (Table 3.2).

Table 3.2: Community Facilities in ULM

Towns	Cemeteries	Libraries	MPCC	Community Halls	Recreational Facilities	Museums
Victoria West	4 private & 1 public	2	-	3	1 caravan park	1
Richmond	2 public & 1 private	1 private & 1 public	-	3	1 park & 1 caravan park	1
Loxton	1 public & 1 private	1	-	1	1 park & 1 caravan park	-
Merriman	1 private	-	-	--	-	-
Huchinson	1 public	1	-	-	-	-
Farms	-	2	-	-	-	-
Ubuntu LM	12	8	0	7	5	2

The key issues identified in the IDP include:

- Inadequate recreational facilities in all the towns.
- Poor maintenance

In terms of safety and security all three of the main towns have police stations (Table 3.3). There are also magistrate and district courts in Victoria West and Richmond.

Table 3.3: Safety and security facilities in ULM

Towns	Police stations	Magistrate court	District court
Victoria west	1	1	1
Richmond	1	1	1
Loxton	1	-	-
Total	3	2	2

The key issues identified in the IDP include:

- Need for satellite police stations in townships.

- Shortage of police staff and vehicles.
- Shortage of magistrates

3.7 ECONOMIC OVERVIEW

Agriculture
Agriculture is the key economic sector in the PKSDM and ULM. Many of the towns within the district municipal area function mainly as agricultural service centres, with the level of services provided at the centres to a large extent reliable on the intensity of the farming practices in the surrounding area.

Despite the largely semi-arid and arid environment in the district, the fertile land that lies alongside the Orange, Vaal and Riet Rivers supports the production of some of the country's finest quality agricultural products, including grapes and vegetables. The main livestock farming in the region include cattle, sheep and goat farming. Game breeding has also been identified as one of the opportunities which could be linked with the tourism sector for Game reserves and hunting activities.

However, despite the key role played by agriculture there is limited value adding to the farming products within the district and the area is prone to droughts and climate change.

Mining
The main deposits in Pixley ka Seme include alluvial diamond mining along the Orange River and various semi-precious stones, such as tiger-eye and zinc deposits. The region also has various saltpans for the potential of salt production. Uranium deposits also occur in the district.

Tourism
The tourism sector in the district contributes 15.6% to the provincial gross value added (GVA). The municipalities Emthanjeni, Kareeberg, Umsobomvu and Siyancuma municipalities are the biggest contributors to the provincial gross value added (GVA). The PKSDM IDP notes that the tourism opportunities in the district will increase due to the Karoo Array Telescope (KAT), a project being driven at a national level. Of relevance, the PKSDM notes that care needs to be taken with developments that have the potential to negatively impact on the Karoo landscapes.

Renewable energy
Of key relevance the PKSDM IDP identifies renewable energy as key economic sector and refers to the substantial socio-economic development (SED) and enterprise development (ED) contributions leveraged by the IPPPP commitments. The IDP notes that the towns of Prieska and Carnarvon have in recent years changed character from small rural towns to potentially regional hubs as a result of investments in renewable energy generation and the Square Kilometre Array (SKA) radio telescope project, respectively.

3.8 OVERVIEW OF STUDY AREA

3.8.1 Introduction

As indicated above, Great Karoo Renewable Energy (Pty) Ltd is proposing the development of a 132kV central collector substation and a 132kV double circuit power line on a site located approximately 35km south-west of Richmond and 80km south-east of Victoria West, within the UM in the Northern Cape Province. The entire extent of the site falls within the Central Corridor of the Strategic Transmission Corridors. The collector substation, which

comprises an Eskom portion and an IPP portion, is proposed on Portions 0 and 1 of the Farm Rondavel 85. The project area is located just to the west of the N1, between Richmond and Three Sisters, roughly halfway between Johannesburg and Cape Town (Figure 3.5).

Richmond, the nearest settlement, is located ~29 km to the north-east of the project area. Victoria West is located ~40 km north-west of the project, and the fuel station complex at Three Sisters ~38 km to the south-west. Most affected properties and essentially the entire proposal (options) fall within the Northern Cape Province. Schietkuil 3/RE falls within the Western Cape Province but would only be affected along its extreme western boundary (which is also the provincial boundary). Richmond forms part of the UM, with administrative centre in Victoria West. Beaufort West and Graaff-Reinet (both well over 100 km away) are the nearest large settlements for accessing higher order retail and services.

Figure 3.5: Properties affected by the proposed grid connection (white outlines) indicated in relation to local settlements, provincial boundaries (purple), Eskom lines (orange) and Hutchinson public gravel road in bold (red).

The study area is accessed from the N1 and the R63 (Victoria West – Graaff-Reinet). Essentially all affected properties are directly accessed off these roads, or via the Hutchinson public road which links the two via Rondawel Farm (Photographs 3.1 and 3.2). The Hutchinson Road is said to be generally well maintained. Three project properties (part of Excelsior farm) are accessed via internal farm roads from the old Victoria West public gravel road further to the north.

Photograph 3.1: Intersection of the N1 and Hutchinson Rd north of Rondawel seen from the north.

Photograph 3.2: Hutchinson public gravel road, looking west from just north of the Rondawel farm yard.

An Eskom transmission line (Tx) corridor traverses the study area and run in a north easterly direction from Eskom's Gamma substation which consists of two facilities (Figure 3.5). The larger facility is located 1.7 km north of the R63, while the smaller facility is located 200 m to the north of the road (Photographs 3.3 and 3.4). The proposal is to feed into the smaller one adjacent to the R63. Option 1 and 2 essentially follow the alignment of the Eskom transmission lines.

Photograph 3.3: Portion of Gamma located on Uitvugtfontein (portion 1) 1.7 km north of the R63.

Photograph 3.4: Portion of Gamma on Schietkuil 3/1 into which the project would feed, located approximately 200 m north of the R63.

A total of five 400 kV and 765 kV lines currently feed into the Gamma substation and run in a north east and south westly direction. The lines to the north east of the substation traverse the project properties. The eastern most four lines are aligned within 350 m of one another (Photograph 3.5). The corridor is 1- 2 km wide across the project properties. Except for a short section immediately to the north east of the Gamma substation, most of the corridor to the north east is screened from the N1 and farmsteads along the N1 by natural topography (Photograph 3.6). None of the transmission lines cross the N1. Four transmission lines traverse the R63 south of the Gamma substation and five traverse the Hutchinson Road on Annexe Rondawel (4) and Roggefontein (1). Cell phone relay towers are located adjacent to the N1 on a number of project properties (Photograph 3.7).

Photograph 3.5: Four (400 kV and 765 kV) Tx lines traversing the Hutchinson Road on Annexe Rondawel.

Photograph 3.6: Existing Tx line corridor on Kleinfontein seen from the N1. This is one of the few locations where the existing corridor is visible from the N1 and adjacent farmsteads.

Photograph 3.7: Cell phone relay tower on Bultfontein seen from the N1.

The study area is located in the Central Karoo region. The terrain is characterized by successions of broad plains enclosed or criss-crossed by a series of kopjes. The vegetation consists of Karroid scrub ('Karoo bossiesveld') (Photograph 3.8). The landscape is essentially treeless, with large trees confined to water courses and farmsteads. Many farmsteads are located at fountains near kopjes. The settlement pattern is sparse and concentrated along public roads (Photograph 3.9). Workers' dwellings are typically located near farmsteads (Photograph 3.10). The majority of the study area farms are inhabited, or form part of nearby farms. Absent landowners often lease out their properties to local farmers. Supervising staff reside on many properties not inhabited by their owners.

Photograph 3.8: Karoo scrub veld and kopjes on portion of Rondawel which would accommodate Great Karoo REF projects.

Photograph 3.9: Uitvlugfontein farmstead along the R63 approximately 4 km west of Gamma.

Photograph 3.10: Labourer's houses on Rondawel seen from the N1.

Land use is almost exclusively agricultural and focused on livestock farming. The study area is a major and well-established producer of wool and mohair, and the capacity is around 1 sheep or goat per 3 ha. Economically viable farming units are around 5 000 – 8 000 ha. The majority of the land owners farm on multiple properties. Properties are stocked year-round, with stock moved between internal camps on a rotational grazing basis. The study area is too arid to support dryland cropping. However, many of the farmers grow fodder crops under irrigation, mainly for own use. Game occurs on many properties, but no commercial hunting takes place on any of the properties located on and or in the vicinity of the project area. Tourism facilities are currently associated with the provision of overnight accommodation along the N1 (Photograph 3.11). The nearest dedicated destinations, Bloemhof Guest Farm and Ratelfontein Private Game Reserve are located 5 km or more from the project and the east of the N1. They are therefore not located within close proximity of the area that would be affected by the proposed transmission line options (Option 1-4).

Photograph 3.11: Entrance to Schietkuil Guest Farm off the N1 approximately 3.7 km east of Gamma.

3.8.2 Properties affected by the alignment

The alignment runs from the Gamma substation in the south west to the collector substation in the north east over a distance of approximately 37.95km and is located ~4.5km north of the N1 along its length. majority of the alignment visually screened from the N1 by the natural topography. over a distance of ~ 37.95 km. The farmstead on Rondawel is located ~1.9 km south of the alignment corridor, while the

The corridor largely follows the existing Eskom corridor (Table 3.4) and deviates only with regard to the 3-4km section to the south-west of the collector substation. Table 3.4 lists the properties affected and illustrates the distance to farm dwellings.

Table 3.4: Overview of affected properties in relation to existing ESKOM infrastructure and alignment corridor

	Property	Eskom	Affected over (km) [6]	Distance to farm dwellings (km) [7]
1	Rondawel 85/RE	2 x 400 1 x 765	0.93	1.9 to NNW[8]
2	Bult en Rietfontein 96/1[9]	2 x 400 2 x 765	2.3	4 to NW
3	Kleinfontein 93/RE	3 x 400 2 x 765	3.7	2 to NW
4	Schietkuil 3/RE	3 x 400 2 x 765	2.4	4 to NW
5	Schietkuil 3/1	3 x 400 Gamma	N/A.	N/A
6	Uitvlught Fontein 265/1	2 x 765 Gamma	3	N/A
7	Burgersfontein 92/RE	3 x 400 1 x 765	8.1	1.2 to SW
8	Wynandsfontein 91/RE	3 x 400 1 x 765	2.3	3.4 to SW
9	Wynandsfontein 91/1	3 x 400 1 x 765	1.2	N/A
10	Vlekfontein 90/3	3 x 400 1 x 765	1.7	2 to SW
11	Nieuwe Fontein 89/1	3 x 400 1 x 765	3.7	4.2 to SW
12	Annexe Rondawel 86/RE	2 x 400 2 x 765	2.9	N/A
13	Annexe Rondawel 86/1	N.a.	Marginal	N/A
14	Rondawel 85/1	2 x 400 2 x 765	6.3	N/A

6 Distances reflect approximate centre lines of proposed corridors across relevant properties. Totals given for properties affected in multiple places (non-contiguous).
7 Distance from nearest inhabited dwelling to nearest outer corridor margin.
8 Shading indicates dwellings 2 km or less from corridor margin.
9 Shading indicates properties with farmsteads or other dwellings.

Apart from portions of Schietkuil and Uitvlugfontein (Gamma substation), all properties are primarily used for stock farming, largely merino wool sheep and angora goats. Irrigated cropping is associated with fodder cropping for own use. Irrigation areas are concentrated near farmsteads, a function of the availability of good water in such localities (Photograph 3.12). Tourist accommodation facilities are located along the N1, on Rondawel and Schietkuil (Photograph 3.13). Both operations are primarily sheep farms that cater for passing traffic associated with the N1. The facility on Schietkuil is not located in significant proximity to the project (>4 km). The facility on Rondawel is located ~500 m to the south of the alignment. Most of the relevant properties are affected by the existing Eskom transmission lines. Only Jan Booysens Onderplaas 94/8 and Annexe Rondavel 86/1 are not affected by Eskom infrastructure. Cell phone relay towers are located along the N1 on Rondawel, Bultfontein and Kleinfontein. As indicated, apart from the properties forming part of Excelsior farm, all the relevant properties are directly accessed from the N1 and R63, or via the Hutchinson gravel road. The Excelsior properties are not inhabited and are accessed via internal farm roads from Excelsior farm along the old Victoria West gravel road located further to the north. Dwellings are located on 9 of the properties, 6 of which inhabited by their owners and workers on a permanent basis. Properties without dwellings typically form part of larger operations on adjacent properties (e.g., Kleinfontein and Excelsior). At least two properties in the study area are leased out by non-resident owners for grazing (Table 3.5)

Photograph 3.12: Angora goats grazing on irrigated pasture on Kleinfontein.

Photograph 3.13: Tourist accommodation on Rondawel.

Table 3.5: Overview of affected properties

	PROPERTY	OWNER	DWELLINGS	LAND USE
1	Rondawel 85/RE	Mr Pieter van der Merwe	Rondawel	Owner and workers live on farm Stock farming Overnight accommodation Proposed Great Karoo REFs
2	Bult en Rietfontein 96/1	Mr André de Vries	Bultfontein	Owner lives in Kroonstad Leased out for grazing
3	Kleinfontein 93/RE	Mr Louis de Jager	Kleinfontein	Owner and workers live on farm Stock farming
4	Schietkuil 3/RE	Mr Izaak van Heerden	Schietkuil	Owner and workers live on farm Stock farming Overnight accommodation
5	Schietkuil 3/1	ESKOM	N.a.	Gamma substation Ptn
6	Uitvlught Fontein 265/1	Mr Louis de Jager	N.a.	Part of Kleinfontein operation Stock farming Gamma substation Ptn
7	Burgersfontein 92/RE	Mr Danny Hugo	Burgersfontein	Owner lives in Victoria West Leased out for grazing
8	Wynandsfontein 91/RE	Mr Hennie Esterhuizen	Wynandsfontein	Owner and workers live on farm Stock farming
9	Wynandsfontein 91/1	Mr Hennie Esterhuizen	N.a.	Part of Wynandsfontein farm Stock farming
10	Vlekfontein 90/3	Mr Hannes Esterhuizen	Poortjie	Owner and workers live on farm Stock farming
11	Nieuwe Fontein 89/1	Mr. Leon Wasserfall	Roggefontein	Owner lives in Cape Town Stock farming Supervisor resident
12	Annexe Rondawel 86/RE	Mr Stephanus van den Heever	N.a.	Part of adjacent Excelsior farm Stock farming
13	Annexe Rondawel 86/1	Mr Stephanus van den Heever	N.a.	Part of adjacent Excelsior farm Stock farming
14	Rondawel 85/1	Mr Stephanus van den Heever	N.a.	Part of adjacent Excelsior farm Stock farming Proposed Great Karoo REFs

SECTION 4: OVERVIEW 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.
- Review of key policy and planning documents.
- Site visit to the study area and comments submitted by key stakeholders.
- Experience/ familiarity of the authors 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 operation phase.
- Assessment of the "no development" alternative.
- Assessment of cumulative impact on sense of place.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The findings of the SIA indicate that investment in renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy and associated energy distribution infrastructure is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The proposed grid connection is also located within the Central Transmission Corridor. The development of the proposed power line is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

- Creation of employment, skills development, and business opportunities.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impact on local farmers and farming operations.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Increased risk of veld fires.

4.3.1 Creation of local employment, skills development, and business opportunities

Based on similar projects the construction phase of for the grid connection will extend over a period of approximately 18 months and create in the region of 50 employment opportunities. Approximately 80% of the jobs will be low-skilled, 15% semi-skilled and 5% skilled. Most of the low and semi-skilled employment opportunities would benefit community members from local towns in the area, including Richmond and Victoria West. Most of the employment opportunities are also likely to accrue to HD members from these local communities. Given high local unemployment levels and limited job opportunities in the area, this will represent a localised, social benefit. The remainder 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. The proponent should therefore commit to employing as many local community members as possible.

The total wage bill will be in the region of R 2-2.5 million (2021 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 over 12 months. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in MM. The capital expenditure associated with the construction of grid infrastructure will be ~ R 110 million and will create opportunities for local companies and the regional and local economy. 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. However, given the relatively small scale of the project and short duration of the construction phase these benefits will be limited.

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

Nature: Creation of employment and business opportunities during the construction phase		
	Without Enhancement	**With Enhancement**
Extent	Local – Regional (2)	Local – Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly probable (4)
Significance	Low (24)	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
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 would 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 ULM 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 ULM 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 service providers. These companies should be notified of the tender process and invited to bid for project-related work.

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 can pose 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.

Given the short duration of the construction phase and relatively small number of construction workers, namely ~ 50, the potential impact on the local community is likely to be negligible.

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 (2)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (15)
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		
Residual 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.		

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 and the contractor(s) should 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 subject to appropriate disciplinary action and/or 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 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.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.3 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 famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open. The presence of construction workers on the site also increases the exposure to local farming operations to the outside world, which, in turn, increases the potential risk of stock theft.

Based on the experience from renewable energy projects in the Komsberg REDZ, including the construction of transmission lines, key issues include:

- Impact of construction related activities and movement of construction vehicles on the veld. Due to the sensitivity of the vegetation disturbances take many years to recover.
- Farm gates left open by contractors. This has resulted in stock losses and increased vulnerability to stock theft. Mixing of flocks of different breeds (e.g., meat and wool sheep) also impacts on farming operations. Time and resources are also spent on recovering stock that has escaped due to gates being left open.
- Damage to farm fences. The damage to farm fences poses the same risks to farming operations as leaving farm gates open. In many instances damage to fences caused by contractors occurs in remote areas and is not reported to the farmer.
- Lack of awareness amongst contractors of the impacts that their activities can have on farming operations.

These issues apply to all of the options (Option 1-4). The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction workers on the site during the construction phase. However, based on experience from other renewable energy projects it would appear that these measures have not always been effectively implemented. The mitigation measures to address these risks are outlined below.

Table 4.3: Assessment of risk to safety, livestock, and damage to farm infrastructure

Nature: Potential risk to safety of 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	Moderate (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		
Residual impacts: No, provided losses are compensated for.		

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

Recommended mitigation measures
Key mitigation measures include:

- A Stakeholder Engagement Plan (SEP) should be prepared prior to the commencement of the construction phase. The SEP should outline the approach to engaging with affected farmers and landowners and addressing concerns and grievances.
- An Environmental Control Officer (ECO) should be appointed to monitor the construction phase. The Environmental Control Officer (ECO) should conduct regular inspections (daily or weekly) of affected farms to ensure farm gates are closed and damage to fences is addressed timeously.
- The proponent should enter into an agreement with 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 movement and construction related activities should be contained within clearly designated areas.
- Strict traffic speed limits must be enforced.
- All farm gates must be closed after passing through.
- Contractors appointed by the proponent should provide daily transport for construction 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 Monitoring Forum (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 in full for any stock losses and/or damage to farm infrastructure that can be linked to construction related activities and or 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 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.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.4 Impacts associated with construction related activities

The construction activities on site and movement of heavy construction vehicles during the construction phase has the potential to create noise and dust impacts, damage local roads and create safety impacts for other road users. Based on the findings of the SIA the potential dust and noise impacts associated with the construction of the power line are likely to be negligible. The traffic related impacts associated with the transport of materials to the site are also likely to be limited. Given the relatively small number of construction workers and the short construction period the traffic related impacts associated with transporting workers to and from the site are likely to be limited. As indicated above, the construction phase also poses a risk to farming operations.

Table 4.4: Assessment of the impacts associated with construction related activities

Nature: Potential noise, dust and safety impacts associated with construction related activities		
	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		
Residual 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.		

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:

- As indicated above, the proponent should consider the establishment of a Monitoring Forum (MF) 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 farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.
- Ongoing communication with land owners and road users during the construction period.
- Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.
- Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads are maintained in a good condition and repaired once the construction phase is completed.
- Repair of all affected road portions at the end of construction period where required.

- Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.
- All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

4.3.5 Risk of veld fires

The presence and movement of construction workers on and off the site and construction related activities such as welding etc., increases the risk of veld fires which pose a risk to livestock, farm infrastructure and game. The loss of grazing also poses a threat to local livelihoods that are dependent on livestock farming. The risk of veld fires is higher during the dry, windy winter months of March through to November. The local landowners indicated that although the risk of veld fires was low, they do pose a threat to farming operations.

Table 4.5: Risk posed by veld fires to livestock, farm infrastructure and grazing

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		
Residual impacts: No, provided losses are compensated for.		

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 should 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 should provide fire-fighting training to selected construction staff.
- No construction staff, with the exception of security staff, to be accommodated on site overnight.
- 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.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

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

Potential positive impacts
- Improved energy security and establishment of energy infrastructure.
- Creation of employment, skills development, and procurement opportunities.
- Generate income for landowners.

Potential negative impacts
- The visual impacts and associated impact on sense of place.
- Impact of maintenance activities on farming activities and operations.

4.4.1 Improved energy security and establishment of energy infrastructure

The proposed Great Karoo EGI is essential to enable the development and operation of the Great Karoo Renewable Energy cluster. The primary goal of the proposed Great Karoo Renewable Energy cluster is to improve energy security in South Africa by generating renewable energy. The proposed Great Karoo EGI should therefore be viewed within the context of South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs.

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million spent by businesses on backup generators[10]. A survey of 3 984 small business owners found that

10 Goldberg, Ariel (9 November 2015). "The economic impact of load shedding: The case of South African retailers" (PDF). Gordon Institute of Business Science. p. 109

44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more of revenue due to load shedding[11].

Table 4.6: Improve energy security, reduce reliance on coal generated power sector

Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Enhancement	**With Enhancement**
Extent	Local, Regional and National (3)	Local, Regional and National (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (52)	High (65)
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		
Residual 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.		

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

Recommended mitigation measures
Should the proposed grid connection infrastructure be approved the proponent should:

- Maximise the number of employment opportunities for local community members.
- Implement training and skills development programs for members from the local community.
- Maximise opportunities for local content and procurement.

4.4.2 Creation of employment, skills development, and business opportunities

The potential employment, skills development and business-related opportunities associated with the Great Karoo EGI will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits are therefore likely to be limited. The potential opportunities can however be enhanced if a local service provider is appointed to

11 "How does load shedding affect small business in SA?". The Yoco Small Business Pulse (3: Q1 2019):

undertake the work required. This may involve providing training and skills development to enable a locally based service provider to provide the required services.

Table 4.7: Impact assessment of employment, skills development, and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Enhancement	**With Enhancement**
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Low (28)	Medium (40)
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual 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		

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

In addition, the proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the maintenance of the grid connection infrastructure and other aspects for the proposed wind energy facility.

4.4.3 Generate income for affected landowners

The proponent will be required to either purchase the land or enter into a rental agreement with the affected landowners for the use of the land for the establishment of the grid connection infrastructure. Based on the findings of the SIA the area is prone to droughts and farming operations can be challenging. Any additional source of income therefore represents a significant benefit for the affected landowner(s). The additional income would assist to reduce the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. The additional income would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy.

Table 4.8: Assessment of benefits associated with income generated for affected farmer(s)

Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Enhancement	**With Enhancement**
Extent	Local (1)	Local (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Low (27)	High (65)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Support for local agricultural sector and farming		

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

Recommended enhancement measures
Implement agreements with affected landowners.

4.4.4 Visual impact and impact on sense of place

The area's existing sense of place has been altered by existing Eskom transmission lines and the Gamma substation. The proposed grid connection infrastructure is also located within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of the grid infrastructure. The potential impact on the broader area's sense of place associated with the proposed grid connection will therefore be low.

In terms of visibility, specifically visibility from the N1, the alignment is ~ 4-4.5km north of the N1 and the majority of the alignment is screened by the natural topography. The alignment also follows the existing Eskom transmission lines. The alignment was also regarded as acceptable by affected landowners interviewed.

Table 4.9: Visual impact and impact on sense of place

Nature: Visual impact associated with the grid connection 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	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (40)	Medium (36)
Status	Negative	Negative
Reversibility	Yes, grid infrastructure components can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: Potential impact on current rural sense of place		

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.

4.4.5 Impact on farming operations during maintenance[12]

The presence and movement of maintenance workers on and off the site poses a potential risk to farming operations. Farm fences and gates may be damaged and stock losses may also result from gates being left open. The presence of maintenance workers on the site also increases the exposure of their farming operations and livestock to the outside world, which, in turn, increases the potential risk of stock theft and crime.

As indicated above, based on experience from other renewable energy projects, the key issues include:

- Impact of maintenance related activities and movement of maintenance vehicles on the veld. Due to the sensitivity of the vegetation disturbances take many years to recover.
- Farm gates left open by maintenance contractors and Eskom employees. This was raised as key concern by all the affected landowners interviewed. This has resulted in stock losses and increased vulnerability to stock theft. Mixing of flocks of different breeds (e.g., meat and wool sheep) also impacts on farming operations. Time and resources are also spent on recovering stock that has escaped due to gates being left open.

12 The impacts are similar to the impacts associated with construction phase.

- Damage to farm fences. The damage to farm fences poses the same risks to farming operations as leaving farm gates open. In many instances damage to fences caused by contractors occurs in remote areas and is not reported to the farmer.
- Lack of awareness amongst contractors of the impacts that their activities can have on farming operations.

Based on experience with maintenance of the existing Eskom power lines this is an issue that will need to be addressed. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by ensuring the maintenance teams take care to ensure that gates are kept closed and affected property owners are kept informed about timing of maintenance operations. Mitigation measures to address these risks are outlined below. However, the findings of the SIA indicate that despite measures being in place, these measures are not being implemented affectively by the contractors working in the area.

Table 4.10: Assessment of risk to farming operations and damage to farm infrastructure

Nature: Potential risk to safety to farming operations and livestock associated with the presence of maintenance workers on the site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Low (28)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: No**,** provided losses are compensated for.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended mitigation measures
- Affected property owners should be notified in advance of the timing and duration of maintenance activities.
- Maintenance teams must ensure that all farm gates must be closed after passing through.
- Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities.
- Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations.
- Strict traffic speed limits must be enforced on the farm.
- No maintenance workers should be allowed to stay over-night on the affected properties.

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

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 grid connection infrastructure. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more transmission lines) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more transmission lines) along a single journey, e.g. road or walking trail).
- The visual compatibility of two or more transmission lines 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 study area is traversed by several existing Eskom transmission lines associated with the Gamma substation. The potential for cumulative impacts associated with the 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 cumulative impact on the areas sense of place is likely to be low. None of the affected property owners interviewed identified visual impacts as a concern. The area also falls within the Central Transmission Corridor.The area has therefore been identified as suitable for the establishment of the grid infrastructure.

Table 4.11: 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 area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (36)	Medium (40)
Status (positive/negative)	Negative	Negative
Reversibility	Yes, grid infrastructure components can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: See below		

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.

4.6 ASSESSMENT OF NO-DEVELOPMENT OPTION

The grid connection infrastructure is essential to enable the proposed Great Karoo Renewable Energy cluster to connect to the national electricity grid to address the current energy supply constraints and reduce South Africa's reliance on coal generated energy. As indicated above, energy supply constraints and associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore 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 of carbon emissions.

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

Table 4.12: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to improve energy security and assist to support with the development of clean, renewable energy		
	Without Mitigation13	**With Mitigation14**
Extent	Local-National (3)	Local-National (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (52)	Moderate (52)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		

Recommended enhancement measures

The proposed grid infrastructure should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.

13 Assumes project is not developed
14 Assumes project is developed

SECTION 5: KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

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

- A review of key planning and policy documents pertaining to the area.
- Site visit and semi-structured interviews with interested and affected parties.
- A review of social and economic issues associated with similar developments.
- A review of relevant literature on social and economic impacts.
- The experience of the authors with other renewable energy projects in South Africa

5.2 SUMMARY OF KEY FINDINGS

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

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

5.2.1 Policy and planning issues

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy and associated energy distribution infrastructure is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The proposed grid connection infrastructure is also located within the Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of grid infrastructure. The development of the proposed Great Karoo EGI is therefore supported by key policy and planning documents.

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 12-18 months and create in the region of 50 employment opportunities. The total wage bill will be in the region of R

2-2.5 million (2022 Rand values). Most of the low and semi-skilled employment opportunities are likely to benefit residents from local towns in the area, including Richmond and Victoria West. Most the beneficiaries are likely to be HD members of the community. This would represent a short term 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 UM. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. The proponent should therefore commit to employing as many local community members as possible.

The capital expenditure associated with the construction of the grid connection infrastructure will be ~110 million (2022 Rand values) and will create opportunities for the local and regional and local economy. The sector of the local economy 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. However, given the relatively small scale of the development and short construction period the benefits will be limited.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Noise, dust, and safety impacts of construction related activities and vehicles.
- Risk of veld fires.
- Risks posed to farming activities by construction workers.

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the construction of the grid connection infrastructure 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	Low (Positive)	Moderate (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Low (Negative)	Low (Negative)
Impact of construction activities and vehicles	Low (Negative)	Low (Negative)
Risk of veld fires	Moderate Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Moderate Negative)	Low (Negative)

5.2.3 Operational phase impacts

The benefits associated with the Great Karoo Renewable Energy Cluster are dependent upon these facilities being able to connect to the national grid. The key social issues associated with the operational phase include:

Potential positive impacts
- Improved energy security and establishment of energy infrastructure.
- Creation of employment, skills development, and local procurement opportunities.
- Generate income for landowners.

Potential negative impacts
- The visual impacts and associated impact on sense of place.
- Risks posed to farming activities by maintenance workers.

The findings of the SIA indicate that the significance of the potential negative impacts is likely be **Low Negative** if the required mitigation measures are effectively implemented.

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

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation / Enhancement	Significance With Mitigation / Enhancement
Improve energy security and establishment of energy infrastructure	Medium (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Moderate (Positive)
Generate income for landowners	Low (Positive)	Moderate (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Risk to farming operations during maintenance	Low (Negative)	Low (Negative)

5.2.4 Cumulative impact on sense of place

The study area is traversed by several existing Eskom transmission lines associated with the Gamma substation. The potential for cumulative impacts associated with the 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 cumulative impact on the areas sense of place is likely to be low. None of the affected property owners interviewed identified visual impacts as a concern. The area also falls within the Central Transmission Corridor.The area has therefore been identified as suitable for the establishment of the grid infrastructure.

5.2.5 Assessment of no-development option

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

5.3 CONCLUSIONS AND RECOMMENDATIONS

Conclusion
The energy security benefits associated with the proposed Great Karoo Renewable Energy Cluster are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed grid connection are ***Low Negative*** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The alignment was also regarded as acceptable by affected landowners interviewed.

The power line is also located within the Central Transmission Corridor. The establishment of proposed Great Karoo Electrical Grid Infrastructure (EGI) is therefore supported by the findings of the SIA.

ANNEXURE A

REFERENCES

- The National Development Plan (2011).
- The New Growth Framework (2010).
- The National Infrastructure Plan (2012).
- The Integrated Energy Plan (1998).
- 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).
- Pixley ka Seme District Municipality Integrated Development Plan (2019-2020).
- Pixley ka Seme District Municipality Spatial Development Framework (2017).
- Ubuntu Local Municipality Integrated Development Plan (2019-2020).

INTERVIEWS

- De Jager, Mr Louis (telephonic, 2021-12-07). Owner Nuwefontein and Uitvlugfontein farms.
- De Vries, Mr Andre (telephonic, 2021-12-07). Owner Bultfontein farm.
- Esterhuizen, Mr Hannes (telephonic, 2021-12-10). Owner Poortjie farm.
- Esterhuizen, Mr Hennie (telephonic, 2021-12-06). Owner Wynandsfontein farm.
- Hugo, Mr Danny (telephonic, 2021012-06). Owner Burgersfontein farm.
- Reynolds, Mr Kobus (telephonic, 2021-12-07). Owner Nuwefontein farm.
- Van der Heever, Mr Stephanus (2021-12-06). Owner Excelsior farm.
- Van der Merwe, Mr Pieter (2021-12-06). Owner Rondawel farm.
- Wasserfall, Mr Leon (telephonic 2021-12-09). Owner Roggefontein farm.

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

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

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

Tony Barbour
ENVIRONMENTAL CONSULTING AND RESEARCH

10 Firs Avenue, Claremont, 7708, South Africa
(Tel) 27-21-761 2355 - (Fax) 27-21-761 2355 - (Cell) 082 600 8266
(E-Mail) tbarbour@telkomsa.net

Tony Barbour's has 26 years' experience in the field of environmental consulting and management. His experience 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 260 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, Senegal, Nigeria, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan and Armenia.

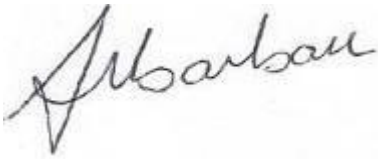
ANNEXURE D

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):

15 December 2021

Date: