

**SOCIAL IMPACT ASSESSMENT
FOR
ESIZAYO WIND ENERGY FACILITY
EXPANSION PROJECT
WESTERN CAPE PROVINCE**

APRIL 2022

Prepared for

WSP

by

Tony Barbour and Schalk van der Merwe

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

10 Firs Avenue, Claremont, 7708, South Africa

(Tel) 27-21-797 1361 - (Fax) 27-21-797 1361- (Cell) 082 600 8266

(E-Mail) tbarbour@telkomsa.net

EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

Tony Barbour was appointed by WSP to undertake a specialist Social Impact Assessment (SIA) as part of the Basic Assessment (BA) process for the Esizayo Wind Energy Facility (WEF) Expansion Project which involves the establishment of up to 23 wind turbines in the expansion area located adjacent to the approved Esizayo WEF (DEA Ref No: 14/12/16/3/3/2/967). The expansion area is located within Laingsburg Municipality in the Western Cape Province, approximately 25km north of the small settlement on Matjiesfontein. The study area is located within the Komsberg Renewable Energy Zone (REDZ).

This report contains the findings of the Social Impact Assessment (SIA) Report undertaken 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.

FIT WITH POLICY AND PLANNING

At a national level, the development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to renewable energy. Renewable energy is also supported at a provincial and local municipal level. The proposed site is also located within the Komsberg REDZ, which was formally gazetted in 2018¹. The area has therefore been identified as suitable for the establishment of renewable energy facilities and associated infrastructure.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 18 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. Members from the local communities in Laingsburg,

¹ GN114 of 2018

Matjiesfontein and Sutherland may potentially qualify for low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit.

However, based on the experience from existing REFs that have been established on the Komsberg REDZ, the employment opportunities for members from the local community have been limited. This has in part been due to the low education and skills levels in the area. Therefore, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment are likely to be limited.

The total wage bill will be in the region of R 31 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area and the LM. The capital expenditure associated with the construction phase will be approximately R 2 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the LM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

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

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

Table 1: Summary of social impacts during construction phase

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

OPERATION PHASE

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

Potential positive impacts

- Establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits for local landowners.
- Benefits associated with socio-economic contributions to community development.

The proposed project will supplement South Africa’s energy and assist to improve energy security. In addition, it will also reduce the country’s reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts

- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	Medium (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Impact on property values	Low (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

CUMULATIVE IMPACT ON SENSE OF PLACE

Three operational WEFs (Perdekraal East, Roggeveld and Karusa WEF) are located within 35km of the proposed site. The site and general area are also traversed by the Eskom 400 kV and 765 kV transmission line. Added to this the Brandvalley and Rietkloof WEFs were awarded preferred bidder status in 2021 and construction is expected to commence in 2022. The potential for cumulative impacts is therefore high.

However, the cumulative impact on the areas sense of place should be viewed within the context of the site's location within the Komsberg REDZ and Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of large scale renewable energy facilities and associated grid infrastructure. The visual character of the area has also already been substantially altered by existing WEFs and transmission lines in the area. Cumulative visual impacts on the areas sense of place cannot therefore be avoided.

CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The findings of the SIA indicate that there is insufficient accommodation available in Laingsburg, Matjiesfontein and Sutherland to accommodate construction workers associated with 2 or more projects. The cumulative impacts on accommodation and local services (health care, clinics etc.) will therefore be significant. There is therefore a need to provide new accommodation and up-grade local services. With effective planning the significance of this impact with mitigation was rated as **Low Negative**.

CUMULATIVE IMPACT ON LOCAL ECONOMY

The significance of this impact with enhancement was rated as **High Positive**.

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with flexible and cleaner (compared to coal) 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.

CONCLUSION AND RECOMMENDATIONS

The findings of the SIA indicate that the proposed Ezisayo WEF expansion project will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development through socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented.

The Ezisayo WEF expansion project is also located within the Komsberg REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities. The establishment of the proposed Ezisayo WEF expansion project is therefore supported by the findings of the SIA.

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 <i>curriculum vitae</i> ;	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 2022 (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	Comply with the Assessment Protocols that were

<p>specialist report, the requirements as indicated in such notice will apply.</p>	<p>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.</p>
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ACRONYMS

DEA&DP	Department of Environmental Affairs and Development Planning
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
KHM	Karoo Hoogland Municipality
LM	Laingsburg Municipality
LED	Local Economic Development
LM	Local Municipality
MW	Megawatt
PGWC	Provincial Government Western Cape
REDZ	Renewable Energy Development Zone
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
SDF	Spatial Development Framework
SIA	Social Impact Assessment
WEF	Wind Energy Facility

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SECTION 1: INTRODUCTION

1.1 INTRODUCTION

Tony Barbour was appointed by WSP to undertake a specialist Social Impact Assessment (SIA) as part of the Basic Assessment (BA) process for the Esizayo Wind Energy Facility (WEF) Expansion Project which involves the establishment of up to 23 wind turbines in the expansion area located adjacent to the approved Esizayo WEF (DEA Ref No: 14/12/16/3/3/2/967). The expansion area is located within the Laingsburg Municipality in the Western Cape Province, approximately 25 km north of the small settlement on Matjiesfontein (Figure 1.1). The study area is located within the Komsberg Renewable Energy Zone (REDZ).

This report contains the findings of the Social Impact Assessment (SIA) Report undertaken as part of the BA process.

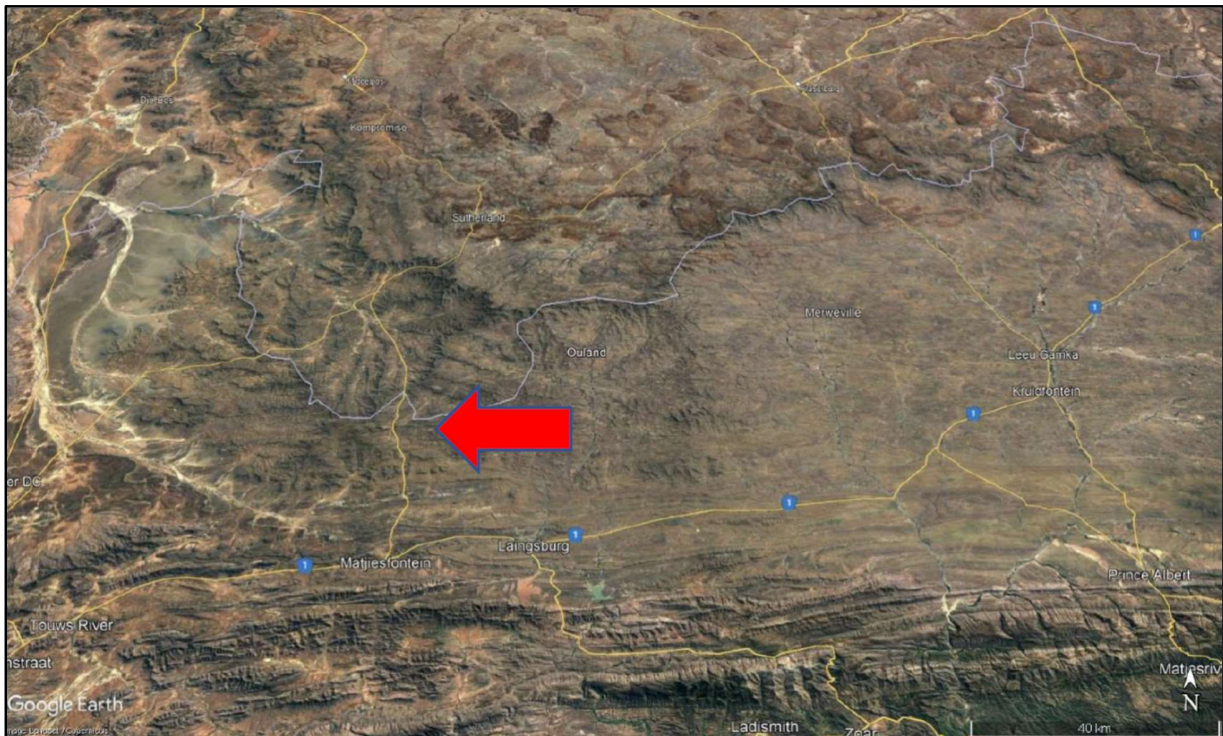


Figure 1.1: Location of Esizayo Expansion Project area (red arrow)

1.2 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 (DEADP, 2007). The key activities undertaken as part of the SIA process as embodied in the guidelines included:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), and the community, land uses and activities that may be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Review of key policy and planning documents that have a bearing on the project.
- Site visit and interviews with key stakeholders.
- Identifying the key potential social issues associated with the proposed project.
- Assessing and assessing the significance of social impacts associated with the proposed project.
- Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

1.3 PROJECT DESCRIPTION

A wind energy facility (WEF) consists of multiple wind turbines which are used to capture the kinetic energy of the wind and generate electricity. This captured kinetic energy is used to drive a generator located within the wind turbine and the energy is subsequently converted into electrical energy. Photograph 1.1 illustrates typical wind turbine which consists of four primary components.

- The **foundation unit** upon which the turbine is anchored to the ground.
- The **tower**, which is a hollow structure allowing access to the nacelle (see below). The height of the tower is a key factor in determining the amount of electricity a turbine can generate. The tower houses the transformer which converts the electricity to the correct voltage for transmission into the grid.
- The **nacelle** (generator/turbine housing). The nacelle is located at the top of the tower and houses the gearbox and generator as well as a wind sensor to identify wind direction. The nacelle turns automatically ensuring the blades always face into the wind to maximise the amount of electricity generated.
- The **rotor**, which is typically comprised of three rotor blades with a diameter varying between 100 and 200 m.

The amount of energy a turbine can harness is dependent on the wind velocity and the length of the rotor blades. Wind turbines typically start generating power at wind speeds of between 10 - 15 km/hour, with speeds between 45 - 60 km/hour required for full power operation. In a situation where wind speeds are excessive, the turbine automatically shuts down to prevent damage. A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a WEF can be monitored and controlled remotely, with a mobile team used for maintenance, when required.



Photograph 1.1: Typical example of wind turbine

The wind turbines associated with the Esizayo WEF Expansion Project are located on Portion 2 of Farm Aanstoot Farm 7, Portion 1 of Farm Leeuwenfontein 71 and Remainder of Farm Leeufontein 71. The proposed WEF and associated infrastructure includes the following components:

- Up to 23 wind turbine generators (WTGs) with a maximum generation capacity of up to 200MW.
- Turbines with a hub height of up to 150m and a rotor diameter of up to 200m.
- Each turbine with a foundation of up to 25m in diameter and up to 4m in depth, compacted hard standing areas of up to 4.5 ha each.
- 33kV underground cable or overhead powerlines linking groups of wind turbines to onsite 33 and 132kV substation/s.
- 30 km of internal roads with a width of 4-8m to provide access to turbine sites. Existing roads will be upgraded wherever possible, although new roads will be constructed where necessary.
- A temporary construction laydown/staging area which will also accommodate the operation and maintenance (O&M) buildings.

1.4 ASSUMPTIONS AND LIMITATIONS

1.4.1 Assumptions

Strategic importance of the project

The strategic importance of promoting renewable energy is supported by the national and provincial energy policies. The power line route is also located within Komsberg REDZ. However, this does not mean that site related issues can be ignored or overlooked.

Fit with planning and policy requirements

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

The proposed expansion project is also located within the Komsberg REDZ. The area has therefore been identified as being suitable for the establishment renewable energy facilities and associated infrastructure.

1.4.2 Limitations

Demographic data

The information contained in some key policy and land use planning documents, such as Integrated Development Plans etc., may not contain data from Community Household Survey of 2016. However, this will not have a material impact on the findings of the study.

1.5 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.

1.6 DECLARATION OF INDEPENDENCE

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

1.7 REPORT STRUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction.
- Section 2: Policy and planning context.
- Section 3: Overview of study area.
- Section 4: Identification and assessment of key issues.
- Section 5: Summary of key findings.

SECTION 2: POLICY AND PLANNING CONTEXT

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 fit²” 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 Esizayo WEF. The review therefore includes reference to key policy documents that have a bearing on renewable energy. Most of the site is located within the Western Cape Province, with a small portion falling within the Northern Cape. At the local level the focus of the review has been on Local Municipal level policy and planning documents.

- National Development Plan (2011).
- National Energy Act (Act No 34 of 2008).
- White Paper on Energy Policy (1998).
- White Paper on Renewable Energy (2003).
- Integrated Energy Plan (2019).
- Integrated Resource Plan (2018).
- New Growth Path Framework (2010).
- National Infrastructure Plan (2012).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Western Cape Provincial Spatial Development Framework (2014).
- Western Cape Infrastructure Framework (2013).
- Western Cape Provincial Strategic Plan (2014).
- Western Cape Green Economy Strategy (2013).
- One Cape 2040 (2012)
- Laingsburg Integrated Development Plan (IDP) (2017-2022).
- Laingsburg Local Economic Development Strategy (2019-2029).

2.2 NATIONAL DEVELOPMENT PLAN

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial

² “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.

plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.3 NATIONAL ENERGY ACT

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

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

2.4 WHITE PAPER ON THE ENERGY POLICY OF THE REPUBLIC OF SOUTH AFRICA

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

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

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

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

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

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

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

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

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

Disadvantages include:

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

2.5 WHITE PAPER ON RENEWABLE ENERGY

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

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol³, Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual. In this regard, the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

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

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

2.6 INTEGRATED ENERGY PLAN

The purpose of the Integrated Energy Plan (IEP) (2016) is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and

³ The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

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

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

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

Wind

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

Solar

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

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

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

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

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

2.7 INTEGRATED RESOURCE PLAN

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

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

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

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

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

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

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

<ul style="list-style-type: none"> Installed Capacity Committed/Already Contracted Capacity Capacity Decommissioned New Additional Capacity Extension of Koeberg Plant Design Life Includes Distributed Generation Capacity for own use 	<ul style="list-style-type: none"> 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030. Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work. Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility. Short term capacity gap is estimated at 2,000MW.
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Figure 2.1: Summary of energy allocations and commitments

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

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

2.8 THE NEW GROWTH PATH FRAMEWORK

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

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard, clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.9 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.

2.7 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). 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). 8 REDZs and 5 Power Corridors have been identified. 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 total number of REDZ is therefore 11 (Figure 2.2). The proposed project is located within the Komsberg REDZ.

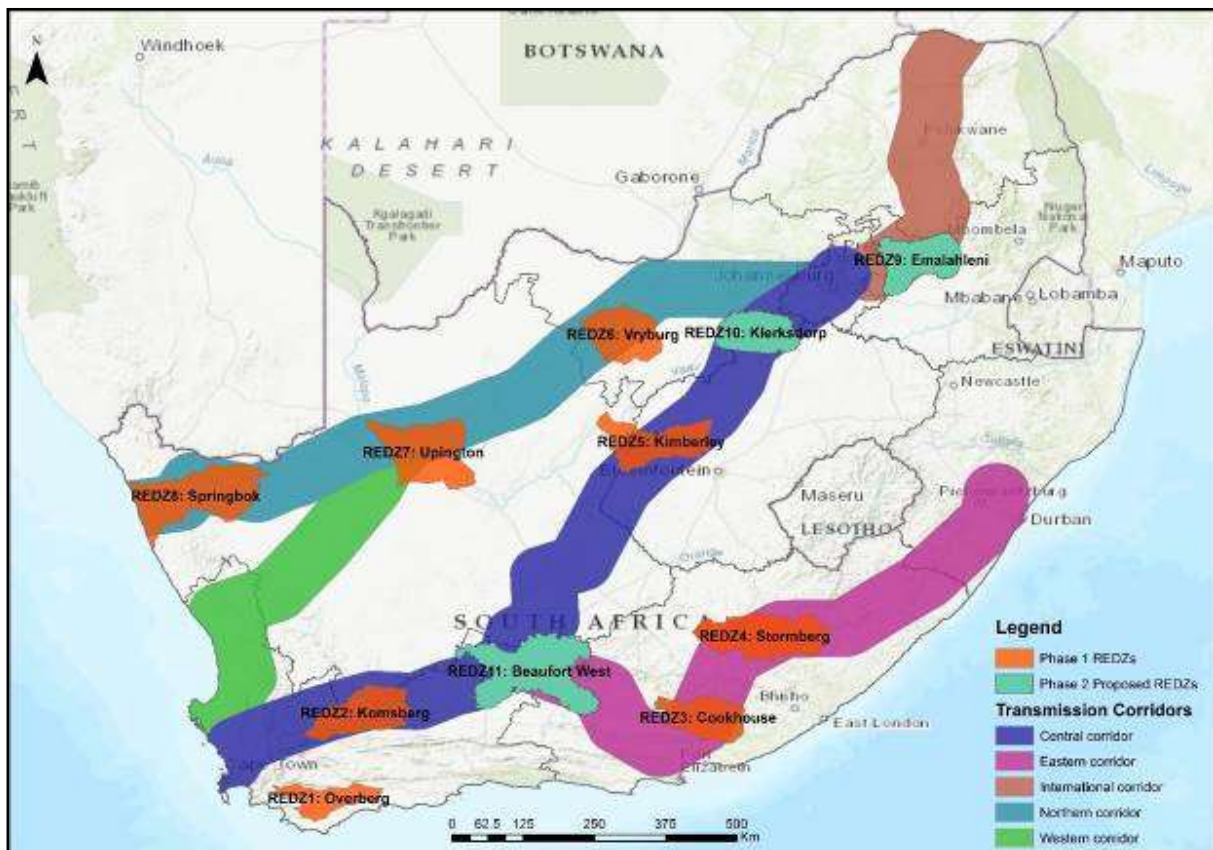


Figure 2.2: Location of Renewable Development Zones and Transmission Corridors in South Africa (Source CSIR)

2.8 WESTERN CAPE PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK

The Western Cape Provincial Spatial Development Framework (PSDF) (2014) is based on a set of 5 guiding principles, namely:

- Spatial justice.
- Sustainability and resilience.
- Spatial efficiency.
- Accessibility.
- Quality and Livability.

Under Sustainability and resilience, the PSDF notes that land development should be spatially compact, resource-frugal, compatible with cultural and scenic landscapes, and should not involve the conversion of high potential agricultural land or compromise ecosystems (p. 22). The 2004 Growth Potential Study was also revised in 2013 as part of the PSDF process⁴.

Key spatial challenges are outlined in Chapter 2 of the PSDF. Energy security and climate change response are identified as key high-level future risk factors. The PSDF notes that the WCP is subject to global environmental risks such as climate change, depletion of material resources, anticipated changes to the global carbon regulatory environment, and food and water insecurity. The challenge would be to open up opportunities for inclusive economic growth, and decouple economic growth from resource consumptive activities (i.e. the development of a 'greener' economy, as outlined in the 2013 WCP Green is Smart strategy – see further below).

In this regard, the 2014 PSDF is in response to a number of associated escalating risks, including understanding the spatial implications of known risks (e.g., climate change and its economic impact and sea level rise, flooding and wind damage associated with extreme climatic events); and energy insecurity, high levels of carbon emissions, and the economic impacts of the introduction of a carbon tax (p. 27).

The spatial agenda for the WCP is set out in Chapter 2.6. This agenda is anticipated to deliver on the objectives of greater inclusivity, growth and environmental resilience. The agenda may be summarized as three linked sub-agendas, all addressed in the PSDF:

- (1) Growing the WCP economy in partnership with the private sector, non-governmental and community-based organisations.
- (2) Using infrastructure investment as primary lever to bring about the required urban and rural spatial transitions, including transitioning to sustainable technologies, as set out in the 2013 Western Cape Infrastructure Framework (WCIF), while also maintaining existing infrastructure.
- (3.) Improving oversight of the sustainable use of the Western Cape's spatial assets. This sub-agendum is of specific relevance to climate change response and renewable energy. Its key objective is safeguarding the biodiversity networks, ecosystem services, agricultural resources, soils, and water, as well as the WCP's unique cultural, scenic and coastal resources on which the tourism economy depends. In addition, it seeks to understand the spatial implications of known risks (e.g. climate change) and to introduce risk mitigation and/or adaptation measures.

Chapter 3.1 deals with the sustainable use of the WCP's assets. These are identified as Biodiversity and Ecosystem services; Water resources; Soils and Mineral resources; Resource consumption and disposal; and Landscape and scenic assets. Policies are outlined for each of these themed assets. The last two themed assets are of specific relevance with regard to renewable energy.

Key challenges facing the WCP are identified as matters pertaining to waste disposal, air quality, energy, and climate change.

Energy

⁴ eadp-westerncape.kznshf.gov.za/sites/default/files/news/files/2013-10-15/2013-growth-potential-study-of-towns-report_0.pdf. The 2014 PSDF is informed by three additional studies, also available at the above link.

With regard to energy use, the PSDF notes that the Cape Metro (albeit the province's most efficient user) and West Coast regions are the WCP's main energy users. It further notes that the WCP's electricity is primarily drawn from the national grid, which is dominated by coal-based power stations, and that the WCP currently has a small emergent renewable energy sector in the form of wind and solar generation facilities located in its more rural, sparsely populated areas. The PSDF also reiterates PGWC's commitment to shifting the economy towards gas⁵ as transitional fuel (see WCIP below). Most of the energy discussion in the PSDF is dominated by aspects pertaining to natural gas.

With regard to renewable energy, the following policy provisions are of relevance:

- Policy R.4.6: *Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use.*
- R.4.7: *Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations (as per recommendations of the Strategic Environmental Assessments for wind energy (DEA&DP) and renewable energy (DEA)*⁶.

Unlike the 2009 PSDF, the new PSDF does not provide any spatial provisions with regard to REF or transmission line infrastructure. Instead, such determination is envisaged in terms of the WCP WEF SEA, the DEA REF SEA, municipal SDFs, etc.

In this regard the two policy directives contained in the 2009 PSDF that had a direct relevance for SEFs are not contained in the 2014 revision, namely:

- *HR26 (...) transmission lines (...) should be aligned along existing and proposed transport corridors rather than along point to point cross-country routes.* (Mandatory directive).
- *HR27 Wind farms should be located where they will cause least visual impact, taking into consideration the viability of the project.* (Guiding directive)⁷

Climate change

Water scarcity is identified as probably the key risk associated with climate change. Essentially the same primary response objectives outlined in the 2014 Western Cape Climate Change Response Strategy (WCCCRS – see 4. below) are identified in the PSDF. These are energy efficiency, demand management and renewable energy.

Policy provisions are made with regard to climate change adaptation and mitigation. Concerning renewable energy, the following is of relevance:

- R.4.16: *Encourage and support renewable energy generation at scale.*

⁵ The PSDF at present envisages mainly from offshore West Coast gas fields via a terminal at Saldanha. The PSDF refers to the potential exploitation of own shale reserves, but also to the environmental sensitivity involved.

⁶ See notes under Regional Methodology Review below.

⁷ Assume also applies to solar energy facilities

Landscape and scenic assets

A specialist study was undertaken into the Province's cultural and scenic landscapes. This study⁸ was one of the informants of the 2014 PSDF. It established that the WCP's cultural and scenic landscapes are significant assets underpinning the tourism economy, but that these resources are being incrementally eroded and fragmented. According to the study agriculture is being reduced to 'islands', visual cluttering of the landscape by non-agricultural development is prevalent, and rural authenticity, character and scenic value are being eroded. The mountain ranges belonging to the Cape Fold Belt together with the coastline are identified as the most significant in scenic terms and underpin the WCP's tourism economy.

A number of scenic landscapes of high significance are under threat, mainly from low density urban sprawl, and require strategies to ensure their long-term protection. These include landscapes under pressure for large scale infrastructural developments such as wind farms, **solar energy** facilities, transmission lines and shale gas development in the Central Karoo (p. 54). With regard to renewable energy, the following policy provisions are of relevance: R.5.6: Priority focus areas proposed for conservation or protection include -

- Rural landscapes of scenic and cultural significance situated on major urban edges and under increasing development pressure, e.g., Cape Winelands.
- Undeveloped coastal landscapes under major development pressure.
- Landscapes under pressure for large scale infrastructural developments such as wind farms, solar energy facilities, transmission lines and fracking, e.g., Central Karoo.
- Vulnerable historic mountain passes and 'poorts'.

Chapter 3.2 deals with opportunities in the WCP spatial economy, including with regard to regional infrastructure development. Essentially the same objectives are identified as in the WCIF, including the promotion of a renewable energy sector (p.61). General project-based (EIA and specialist assessment) provisions are made for evaluating the suitability of sites proposed for bulk infrastructure (Policy E.1).

2.9 WESTERN CAPE INFRASTRUCTURE FRAMEWORK

The Western Cape Infrastructure Framework (WCIF)(2013) was developed by the WCP Provincial Department of Transport and Public Works in terms of the Provincial Government's mandate to coordinate provincial planning under Schedule 5A of the Constitution. The objective of the WCIF is to align the planning, delivery and management of infrastructure to the strategic agenda and vision for the province, as outlined in the 2009-2014 Draft Provincial Strategic Plan. The One Cape 2040 and 2013 Green is Smart strategy were other key informants.

The document notes that given the status quo of infrastructure in the province, and the changing and uncertain world facing the Western Cape over the 2-3 decades a new approach to infrastructure is needed. Namely one that satisfies current needs and backlogs, maintains the existing infrastructure, and plans proactively for a desired future outcome. The 2040 vision requires a number of transitions to shift fundamentally the way in which infrastructure is provided and the type of infrastructure provided in WCP.

⁸ DEA&DP Winter and Oberholzer (2013). *Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape. - A Study prepared for the Western Cape Provincial Spatial Development Framework*. Draft 5. See footnote 1 above.

The WCIF addresses new infrastructure development under five major 'systems' (themes), and outlines priorities for each. Energy is one of the 'systems' identified. The document notes that a provincial demand increase of 3% per year is anticipated for the period 2012-2040. Key priorities are in matching energy generation/ sourcing with the demand needed for WCP economic growth. Additionally, the energy focus should be on lowering the provincial carbon footprint, with an emphasis on renewable and locally generated energy.

Three key transitions are identified for the WCP Energy 'system' infrastructure, namely:

- Shifting transport patterns to reduce reliance on liquid fuels.
- Promoting natural gas as a transition fuel by introducing gas processing and transport infrastructure.
- Promoting the development of renewable energy plants in the province and associated manufacturing capacity.

2.10 WESTERN CAPE PROVINCIAL STRATEGIC PLAN 2014-2019

The Western Cape Provincial Strategic Plan (WCPSP) was adopted by Cabinet in 2014. It builds upon the 2009-2014 Draft Provincial Strategic Plan ('Building an Open Opportunity Society for All') which formed the overarching strategic framework during the incumbent provincial government's first term in office. The WCPSP 2014-2019 sets out the overarching vision and priorities for its second term in office, i.e. until 2019.

The vision statement for the 2014-2019 Plan is 'a highly skilled, innovation-driven, resource-efficient, connected, high-opportunity society for all'. It is hoped that the systems, structures, and budgets which were put in place during the first term would help facilitate implementation of the new Plan. At the same time, the current Plan reflects provincial government's (PGWC) shift from a 'silo-based' (single department) to a transversal (cross-cutting) approach to government. The five strategic goals identified for the 2014-2019 period are:

- Creating opportunities for growth and jobs.
- Improving education outcomes and opportunities for youth development.
- Increasing wellness and safety and tackling social ills.
- Enabling a resilient, sustainable, quality, and inclusive living environment.
- Embedding good governance and integrated service delivery through partnerships and spatial alignment.

Five sets of performance indicators are identified to evaluate implementation of strategies aimed at meeting these goals. In addition, the Plan identifies a number of 'game changers' which would help tackling provincial development issues and result in palpable 'real' change. It envisages that action plans would be prepared by 2015/2016 for each of these identified 'game changers'. The 'game changers' are clustered around three priority areas. Key aspects of the Plan pertaining to renewable energy are discussed below.

Strategic Goal 1: Energy security as 'game changer'

Economic growth/ job creation (Strategic Goal 1) is one of the 3 priority development areas. Achieving Energy security is identified as one of two 'game changers' for fostering this. In this regard, the Plan notes that inadequate electricity supplies over the next five years and beyond threaten to be a significant impediment to growth. A number of strategic priorities are identified to address the issue, including the development of a WCP green economy. The Plan notes that PGWC has prioritized the development of a green economy, with the further aim of establishing it as the green economy hub of Africa.

The Plan further notes that the WCP has already established itself as the national renewable energy hub. In that regard, it is home to developers which have developed more than 60% of the 64 successful projects in the first three rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), as well as a wide array of firms that provide key support services for the industry (engineering and environmental consultancies, legal advisors, etc.). The WCP has also seen the majority of local manufacturing investments. Three of the 4 PV manufacturers that have been successful in supplying to the REIPPPP projects are located in Cape Town, whilst 2014 also saw major global players opening manufacturing facilities for inverters and wind turbine towers.

Future energy security priorities include scaling up renewable energy generation in the province, including embedded generation such as rooftop solar PV, and the importation of liquid natural gas as an alternative power source to support further rollout of renewable energy and low carbon fuel switching (WCPSP, 2014: p.21).

Strategic Goal 4: Reducing greenhouse emissions and improving air quality

The Plan notes that PGWC is committed to improving the resilience, sustainability, quality and inclusivity of the urban and rural settlements. The Plan further notes that while some resource conservation and management improvements have been made, the WCP resource base remains under severe pressure.

Water, energy, pollution and waste, transport and resource-use inefficiencies are leading to extensive environmental degradation, poor air quality, loss of biodiversity and agricultural resources, which result in a deterioration of social and economic conditions. These challenges are further exacerbated by population growth and climate change impacts. It is anticipated that climate change will worsen air quality, as its effects will slow air circulation around the world, resulting in an increase in the frequency and severity of disasters (e.g., fires, floods, and coastal erosion) (WCPSP, 2014: p. 35).

Strategic outcomes pursued under Goal 4 include the enhanced management and maintenance of the ecological and agricultural resource-base; sustainable and integrated urban and rural settlements; and an improved climate change response.

Four outcomes are prioritized, including reduced greenhouse gas emissions and improved air quality. In this regard, the Plan notes that, as air quality and climate change are integrally linked, activities such as reducing fossil fuel burning will address both these priorities (WCPSP, 2014: p. 36). The Plan does not discuss reduced fossil fuel burning or renewable energy in any further detail.

In terms of interventions for air quality management, the Plan refers to the Western Cape Air Quality Management Plan (WCAQMP). The WCAQMP (2010) and associated working groups focus on key interventions relating to governance and integrated management of air quality, climate change, town and regional planning and transport planning. The WCAQMP does not address renewable energy generation.

2.11 WESTERN CAPE GREEN ECONOMY STRATEGY FRAMEWORK

The Western Cape Green Economy Strategy (2013) – 'Green is Smart' - is a framework for shifting the Western Cape economy from its current carbon intensive and resource-wasteful path within a context of high levels of poverty to one which is smarter, greener, more competitive, and more equitable and inclusive. The Strategy is closely aligned with provincial development goals and the 2014 WCCCRS.

The Strategy's point of departure is that while the WCP faces significant challenges in terms of climate change and economic development. Two of the WCP's key economic sectors - both of national importance - agriculture and tourism, are vulnerable to climate change. At the same time, these challenges hold significant potential for opportunities linked to attracting investment, economic development, employment creation, and more resilient infrastructure and patterns of consumption. These opportunities are partly linked to the WCP's existing leadership in some fields of green technology, including knowledge services.

The core objective of the Strategy is to position the WCP as the lowest carbon footprint province in South Africa, and a leading green economy hub on the African continent.

The Strategy framework is made up of 5 drivers of the green economy which are market focused and principally private sector driven and supported by 5 enablers which are either public sector driven, or the product of a collaborative effort.

The five drivers are: smart mobility, smart living and working, smart ecosystems, smart agri-processing and smart enterprise. The relevant cross-cutting enablers are: finance, rules and regulations, knowledge management, capabilities, and infrastructure.

The framework also identifies priorities that would position the WCP as a pioneer and early adopter of green economic activity. These priorities have been identified in terms of the WCP being firstly, a front-runner or pioneer and secondly, an early adopter of innovations and technologies which already exist but are not widely adopted in South Africa. Some priorities are considered game-changers and are singled out as 'high level priorities for green growth'.

Three such 'high level priorities for green growth' are identified, two of which are of relevance here:

- Natural Gas and Renewables: Off-shore natural gas, potential gas baseload power plants and renewable energy IPP programme, together with a greenfield gas infrastructure, will be the game-changer for the Western Cape to be the lowest carbon province in South Africa, and achieve significant manufacturing investment.
- Green Jobs: A green growth path without job growth is unsustainable. There must be early pursuit of priorities with a high rate of job growth potential – notably rehabilitation of natural assets, responsible tourism and the waste sector.

'Under the section dealing with drivers, renewable energy is discussed under 'Smart Enterprise'. The WCP's objective in terms of this driver is to establish the WCP as a globally recognized centre of green living, working, creativity, business, and investment, and thereby attract investment, business and employment opportunities. Based on existing comparative advantages, three key opportunities are identified, one of which is of relevance here, namely, to establish the WCP as Africa's new energy servicing hub.

In this regard, the Strategy document notes that WCP is well placed to be the most important research and servicing hub for the renewable and natural gas energy sectors in South Africa and on the African continent. The Strategy also notes that there are important initial opportunities in the construction of new energy infrastructure. However, the real long-term benefits lie in the servicing of operational infrastructure. In this regard, it is estimated that the annual servicing and maintenance costs of WEFs for instance amount to approximately 10% of the initial capital investment.

Public and market sector procurement are identified as some of the key enablers. The creation of a streamlined regulatory system – the reduction of ‘red tape’ – is identified as a key prerequisite for creating an enabling environment.

Under the section dealing with enablers necessary to unlock development potential, renewable energy is discussed under “Smart Infrastructure”. The Strategy document notes that existing infrastructure systems, particularly those relating to energy and transport, are carbon intensive, with high costs to the environment. Opportunities for the WCP are linked to tapping into infrastructural development funding by leveraging existing advantages.

With regard to the energy sector, the Strategy proposes that the WCP becomes an early adopter of natural gas processing and transport infrastructure and become the hub of Concentrated Solar manufacture and servicing. Natural gas is identified as the key potential ‘game changer’ of the WCP economy, and at present the best way to transition the economy to a more fully integrated renewables sector as major part of the WCP fuel mix in the long term. In this regard, the relative ease with which gas-fired stations could be activated make them an ideal supplement to less predictable wind and solar sources.

Surprisingly, WEF and Solar PV manufacture and servicing receive no specific mention, while Concentrated Solar (CSP) does. The Strategy document justly notes that while the Northern Cape Province is the best suited for CSP facilities, the WCP has strong existing research capabilities in CSP at the University of Stellenbosch (US), and the WCP’s existing manufacturing sector already has the capacity to manufacture many CSP components.

Potential opportunities of commercialisation of CSP technology for local (RSA, Africa) conditions based on US research could be substantial. This subsector is identified as an important area of collaboration between the two provinces to realise the potential benefits (p 41). The key action at this stage to initiate a WCP manufacturing and servicing centre is to lobby for support for a pilot of South African designed CSP technologies, adapted to SA conditions (p. 43).

2.12 WESTERN CAPE CLIMATE CHANGE RESPONSE STRATEGY

The Western Cape Climate Change Response Strategy (WCCCRS) was adopted in February 2014. The strategy is an update of the 2008 Western Cape Climate Change Response Strategy and Action Plan. The key difference with the 2008 Strategy is a greater emphasis on mitigation, including strategically suitable renewable energy development.

The 2014 WCCCRS was updated in accordance with the National Climate Change Response Policy (2013) and is strongly aligned with the overarching provincial objectives contained in the Western Cape Draft Strategic Plan 2009-2014 (2010), and the WCP ‘Green is Smart’ Strategy (2013). In line with the National Climate Change Response Policy, the Strategy takes a two-pronged approach to addressing climate change:

- **Mitigation:** Contribute to national and global efforts to significantly reduce Green House Gas (GHG) emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions.
- **Adaptation:** Reduce climate vulnerability and develop the adaptive capacity of the Western Cape’s economy, its people, its ecosystems and its critical infrastructure in a manner that simultaneously addresses the province’s socio-economic and environmental goals (WCCCRS, 2014: 21).

The Strategy will be executed through an implementation framework which will include an institutional framework for both internal and external stakeholders, with a strong emphasis on partnerships. The framework still has to be prepared. A monitoring and evaluation system is further envisaged in order to track the transition to a low carbon and climate resilient WCP. Policy aspects dealing with mitigation are of specific relevance to renewable energy generation.

Energy and emissions baseline

Based on comprehensive 2009 data for all WCP energy use sectors, the following key findings pertain to overall WCP energy use and emissions:

- Electricity is the key fuel used in the WCP, accounting for 25% of total consumption.
- Approximately 95% of base load electricity is generated from low-grade coal and the remainder by nuclear. The vast bulk of WCP electricity is generated in the north of the country.
- In terms of emissions by sector, electricity is responsible for 55% of total WCP emissions. According to the Strategy, this supports the case for a shift towards renewables and clean energy types.
- Transport (55%) was the greatest energy user, followed by industry (33%). Although domestic consumption accounted for only 8%, it accounted for 18% of emissions, again underscoring the emission-intensive nature of electricity generation.

Mitigation potential

According to the Strategy, the main opportunities for mitigation include energy efficiency, demand-side management, and moving towards a less-emission intensive energy mix.

In the short to medium term, four areas with mitigation potential are identified, including promoting renewable energy in the form of both small-scale embedded generation as well as large scale renewable energy facilities. Together with other mitigation interventions, renewable energy generation is anticipated to result in the following socio-economic benefits:

- Reducing fuel costs to households and business.
- Improving the competitiveness of businesses.
- Job creation opportunities with the development of new economic sectors.
- Local business development.
- Improved air quality (with positive health impacts).
- Reducing the negative impact of large carbon footprints, particularly for export products.
- Reducing stress on energy needs of the province and thereby increasing energy security.

Renewable energy as strategic focus area

Initial implementation of the Strategy will focus on select focus areas aligned with the National Climate Change Response Policy Flagship Programmes and the Western Cape Green Economy Strategy Framework. These focus areas will be reviewed every five years – i.e., the next revision is due in 2019. Renewable area is identified as one of nine focus areas. The Strategy document notes that renewable energy is a key area of focus for the Western Cape and forms a fundamental component of the drive towards the Western Cape becoming the green economy hub for Africa.

The role of provincial government is identified as 'supporting the development of the renewable energy industry through promoting the placement of renewable energy facilities in strategic areas of the Western Cape as well as through supporting renewable energy industries.

The document further notes that waste-to-energy opportunities are being investigated in order to facilitate large-scale rollout. Current investigation includes understanding the most appropriate technologies for waste-to-energy projects as well as developing decision support tools for municipalities to implement waste-to-energy programmes).

Priority areas identified for renewable energy development:

- Development of the Renewable Energy economy in the WCP, in terms of both the appropriate placement of renewable energy as well as manufacturing opportunities.
- Development of waste-to-energy opportunities for both municipal and private sector (commercial and industrial) waste systems.
- Development of opportunities around small-scale renewable energy embedded generation activities.

2.13 ONE CAPE 2040 STRATEGY

The One Cape 2040 (2012) vision was developed by the Western Cape Government, the City of Cape Town (CoCT) and the Western Cape Economic Development Partnership. It was adopted as policy by CoCT Council in 2012. It is aimed at stimulating a transition towards a more inclusive and resilient WCP economy. It seeks to set a common direction to guide planning and action and to promote a common commitment and accountability to sustained long-term progress.

The 2040 Strategy does not replace any existing statutory plans. Rather, it is intended as a basic reference point and guide for all stakeholders planning for long-term economic resilience and inclusive growth.

Six key transitions are identified which to define the necessary infrastructure-related shifts in the WCP. One of these 6 key transitions is an Ecological transition ('Green Cape') from an unsustainable, carbon-intensive, resource use economy, to a sustainable, low carbon-footprint one. The development of renewable energy projects and natural gas are expected to significantly decrease the WCP's carbon footprint.

2.14 LAINGSBURG INTEGRATED DEVELOPMENT PLAN

The LM IDP (2017-2022) identifies six priority area of which the following are relevant to the project:

- Environmental and Spatial Development.
- Local Economic Development.
- Basic Service Delivery.
- Social and Community Development.

Priority 1: Environmental and Spatial Development

The focus of Priority 1 is on creating a safe municipal area, the conservation of the town's heritage and, or relevance to the renewable energy sector, creating a clean green oasis in the Karoo. It also seeks to restore dignity in rural areas. A number of strategic objectives are associated with each of the priority areas listed in the IDP.

Priority 2: Local Economic Development

The focus of Priority 2 is on creating opportunities to ensure growth and development of the Laingsburg municipal economy. Of relevance to the renewable energy sector the IDP notes the commitment of the municipality create an enabling environment and incentives to attract

investment to the area. A number of strategic objectives are associated with each of the priority areas listed in the IDP.

Strategic Objective 2: Promote local economic development

The focus areas for supporting economic development and creating employment are the tourism sector and support for Small Medium Micro Enterprise Developments (SMME's).

Priority 3: Basic Service Delivery

The focus of Priority 3 is to maintain and improve current levels of service delivery in the LM. The IDP also notes that well maintained infrastructure also supports and promote local economic development.

Priority 4: Social and Community Development

The focus of Priority 4 is on promoting equal accessibility for available opportunities for all, especially the poor and the youth. Priority 4 also seeks to create opportunities for moral regeneration by implementing awareness programmes, skills development and training and the provision of free basic services.

Strategic Objective 4: Improve the standards of living of all people in Laingsburg

The IDP lists a number of projects associated with Strategic Objective 3, including implementation of a crime prevention and rehabilitation programme, establishment of ECD Centres, ensuring the effective operation of the towns Thusong Service Centre, and supporting old age facilities in the town. Improved living standards are also linked to a skilled and educated population. The IDP therefore highlights the need to improve overall literacy levels and create opportunities to support education and skills development and training.

A SWOT Analysis undertaken as part of the IDP process lists the strengths, weaknesses, opportunities, and threats facing the LM. The following are relevant to the Needs Assessment.

Strengths

- Stable municipality.
- Well-located in terms of access by road and rail.
- Good infrastructure in place.
- Nice clean town.
- Strong, professional administration with professionalism.
- Good public participatory and ward committee system.
- Established tourism office.
- Thusong Service Centre.

Weakness

- Narrow income base.
- Small business sector.

Opportunities

- Establishment of economic development infrastructure.
- Development of light industrial area.
- Green Energy.
- Training and Skills Development.
- Establishment of organised Business sector

Threats

- Aging municipal infrastructure.
- Climate change and drought.
- High level of grant dependency.
- Skills shortages and difficulty in retaining scarce skills.
- Low literacy rates and high drop-out rates for school children.
- Large distances to large towns.
- Poor condition of gravel roads in rural areas.
- High water losses from municipal infrastructure.

The IDP highlights the threat posed by the impact of climate change, specifically given the key role played by the agriculture to the local economy. The key risks are linked to the long term rise in temperature, variability in precipitation and changes in precipitation patterns and growing season etc. The IDP notes that water availability is the most important limiting factor affecting the agriculture sector (crop and animal production) in the LM. Climate change therefore has the potential to impact on employment and food security.

2.15 LAINGSBURG LOCAL ECONOMIC DEVELOPMENT AND TOURISM STRATEGY

The Laingsburg Local Economic Development (LED) and Tourism Strategy (2019-2029) is informed by and aligned with relevant national, provincial, district and local policies and plans, including the National Development Plan and Western Cape Strategic Plan (2019-2024).

The aim of the LED and Tourism Strategy is to guide the long-term sustainable planning and development of the Laingsburg economy. This includes reducing poverty within the Laingsburg Municipal area. The LED strategy is based on the overall vision outlined in the IDP. The Strategy assesses the current socio-economic environment, outlines strategic goals for the next ten-years, it recommends a series of actions to achieve those goals by leveraging existing assets and strengths, overcoming existing weaknesses and threats, and developing new assets and strengths. The LED Strategy therefore identifies key socio-economic needs facing the LM and strategies to address these needs.

The LED aims to create job opportunities by assisting the local economy to grow by developing more small business in the municipal area, specifically for historically disadvantaged (HD) members of the community. One of the key drivers for LED is tourism. Tourism has the ability and potential to create long-term work opportunities.

The LED and Tourism Strategy identifies a number of key socio-economic trends, challenges and key considerations that have a bearing on the project. These include:

- Climate changes poses a number of challenges to the agricultural sector in Western Cape, including the LM area.
- Laingsburg as a drought prone area is faced with the increased competition for water resources from agricultural and other uses, including urban and industrial.
- The Municipality will need to develop and implement strategies to address climate change and the impact of drought. The predicted increase in the frequency and severity of droughts will have a negative impact on agriculture.
- Agriculture is the backbone of Laingsburg economy. However, the agriculture sector is not diverse, the dominant activity is sheep (wool and meat) farming.
- There is a lack of formal employment, including self-employment opportunities, in the LM.
- The LM has high unemployment rates, low-income levels, and high illiteracy rates. The high illiteracy rates are linked to the high percentage of school drop outs. This has resulted in high poverty rates and increasing levels of substance abuse in Laingsburg.

- There is a shortage of skilled labour.
- There is a high degree of grant dependency.

The LED also identifies the development of a renewable energy centre as strategic initiative.

SECTION 3: OVERVIEW OF THE STUDY AREA

3.1 INTRODUCTION

Section 3 provides an overview of the:

- The administrative context.
- The demographic context.
- The site and surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The proposed Esizayo WEF Expansion Project is located in the Laingsburg Municipality (LM), in the Western Cape Province (Figure 3.1). The LM is one of three local municipalities that make up the Central Karoo District (CKD) Municipality (Figure 3.2). Beaufort West and Laingsburg are the administrative seats of the CKD and LM respectively. The small settlement of Matjiesfontein and the town of Laingsburg are located ~ 25 km and 35 km to the south and south east of the site, respectively. The town of Sutherland in the Karoo Hoogland Municipality within the Northern Cape Province is located ~ 61 km north of the site. An overview of the Karoo Hoogland Municipality is provided given the location of the site.



Figure 3.1: Location of Laingsburg Municipality within Western Cape Province

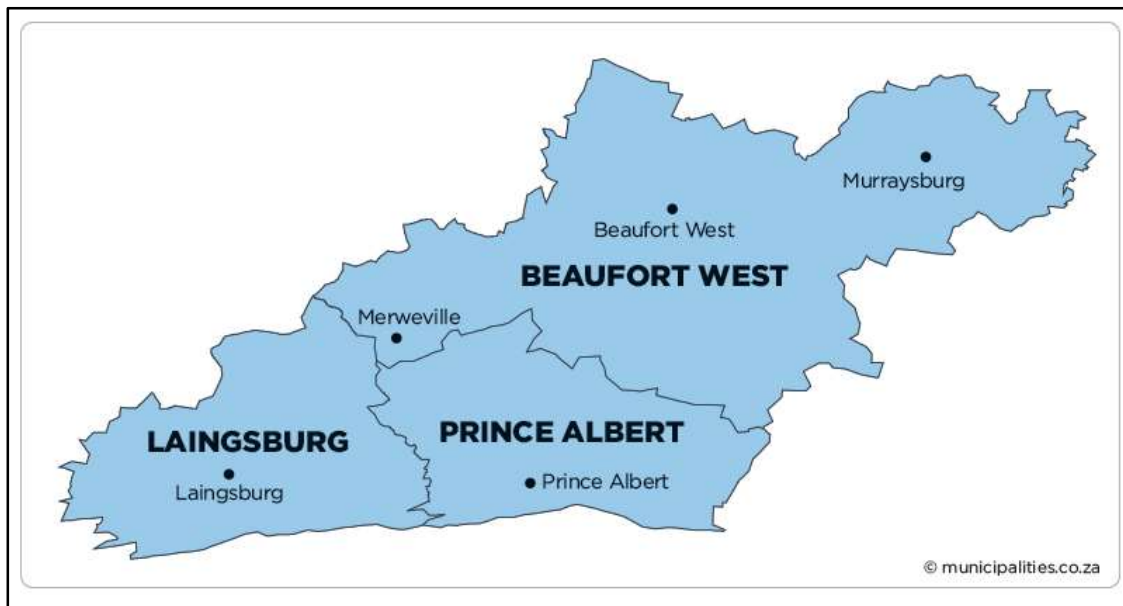


Figure 3.2: Location of Laingsburg Municipality within the Central Karoo District Municipality

Laingsburg

The LM has one main settlement, Laingsburg, and one secondary settlement, Matjiesfontein. They are connected via the N1 Freeway and the main Cape Town to Gauteng railway line. Laingsburg serves as the main service centre, providing medical, educational, as well as limited commercial activities as well as administrative services. Other smaller rural farm settlements include Vleiland in the south-east and Rouxpos. Vleiland has a church and a shop. They are essentially farming communities located to the south of Laingsburg along the R323. Laingsburg is strategically situated on the N1 and rail transport corridor between Gauteng and Cape Town. Laingsburg town is the administrative seat of local government and serves as an agricultural service centre. Matjiesfontein’s economic base is essentially a single tourist resort comprising a Victorian village across the railway line. The population largely comprises hotel staff and a few government employees.

Laingsburg is the largest node in the municipal area. The town was established as a trading post in 1881 and became a municipality in 1904. The national road through the town was completed in 1942. The town serves as the administrative seat of the Laingsburg Municipality and houses the key municipal facilities and commercial services, including the municipal offices, schools, hospitals, clinics, police station, tourism centre, museum, old age home, petrol stations and facilities for motorist and long-haul trucks.

Matjiesfontein

Matjiesfontein was founded in 1884, three years after Laingsburg, by James Douglas Logan during the early stages of the 1st Anglo-Boer war. The Lord Milner Hotel was initially a military hospital. By 1899 the hotel and associated facilities was converted to convalescent centre for patients with respiratory ailments. The hotel and adjacent buildings that make up the village was restored in 1970 and declared a national monument. The village consists of two sections, the historic, Victorian section located to the north of the railway line, and a residential, low-income area, including a clinic and school, located to the south of the railway line. The spatial layout of the village reflects apartheid planning.

Sutherland

The town of Sutherland was founded in 1855 as a church and market town to serve the sheep farming community in the area. The town is located approximately 100 km north of the small village of Matjiesfontein and is accessed via the R 354. The main economic activities include tourism and sheep farming. South African Astronomical Observatory (SAAO) was established outside the town in 1972 and plays a key role in the town's tourism related economy.

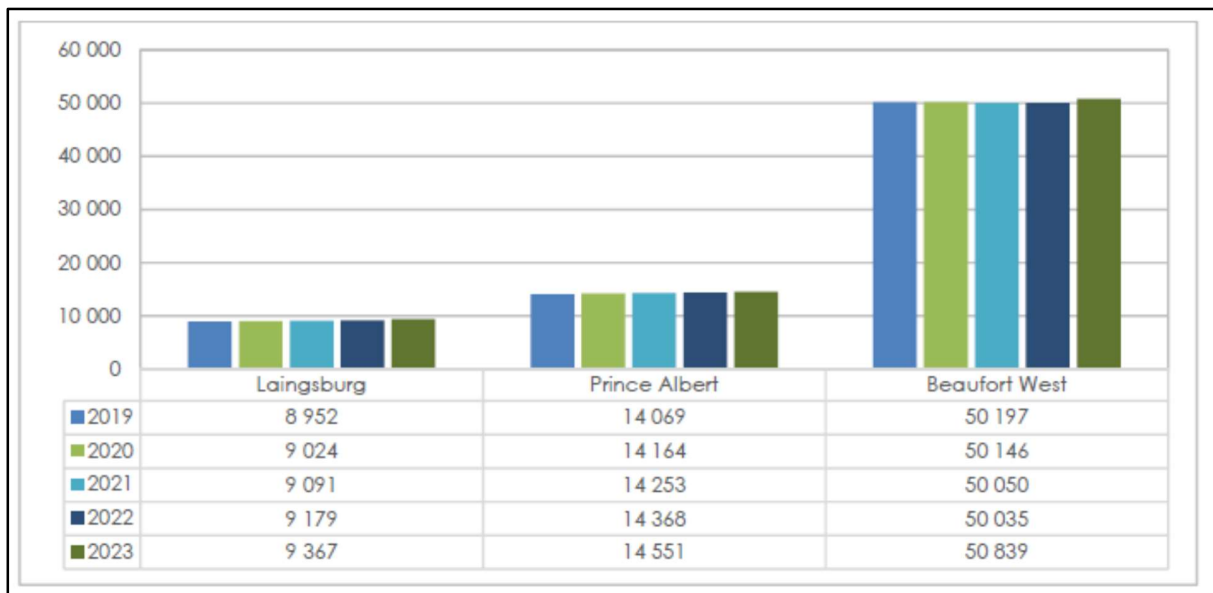
3.3 DEMOGRAPHIC OVERVIEW-LAINGSBURG MUNICIPALITY

3.3.1 Demographics

Population

Based on the 2016 Community Household Survey the population of the LM was 8 895. The LM IDP indicates that ~ 80% population reside in Laingsburg, while ~15% live in the rural parts of the municipal area and 5% reside in the small settlement of Matjiesfontein. In terms of race groups, Coloureds made up 88.2%, followed by Whites (10%) and Black Africans (1.7%). The main first language spoken in the LM was Afrikaans (96%), followed by English (1%) and IsiXhosa (0.8%) (Community Household Survey 2016).

The 2019 Socio-Economic Profile for the Laingsburg Municipality (LM) prepared by the Western Cape Department of Social Development, indicates that the population of the Laingsburg Municipality in 2021 is projected to be 9 024, increasing to 9 367 by 2023 (Figure 3.4). This equates to a 1.1 % annual average growth rate. The estimated population growth rate of Laingsburg is therefore slightly above the estimated population growth of the CKD of 0.5%.



Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

Figure 3.4: Population projections for Laingsburg Municipality

In terms of age, the 2016 Household Community Survey found that 29.5% of the population were under the age of 18, 62.5% were between 18 and 64, and the remaining 8% were 65 and older. The LM therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.

The high percentage of young people also means that a large percentage of the population is dependent on a smaller productive sector. 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%, significantly higher than that of the Western Cape (45%). The dependency ratio for the LM in 2011 was 50.9%. The traditional approach is based people younger than 15 or older than 64. The 2016 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 still likely to be at school or dependent upon their parents or other family members).

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 ratio for the LM (2016) was 60%. This figure is higher than the national, provincial, and municipal levels in 2011. The higher dependency ratio reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality.

The 2019 Socio-Economic Profile for the Laingsburg Municipality indicates that 27% of the population in 2019 fell within the 0-14 age group, 63% fell within the economically active age group of 15 to 65, and 10% were over the age of 65 (Figure 3.5). This translates in a dependency ratio of 57.5%. In terms of projected population growth, the largest population growth is expected to be in the over 65 age group, which is projected to increase at a rate of 2.6%, compared to 1.1% for the economically active group. This will result in a marginal increase in the dependency ratio from 57.5% in 2019 to 57.7% in 2025.

Laingsburg Age Cohorts, 2019 – 2025				
Year	Children 0 – 14 Years	Working Age 16 – 65 Years	Aged 65+	Dependency Ratio
2019	2 438	5 684	830	57.5
2022	2 399	5 880	900	56.1
2025	2 538	6 071	968	57.7
Growth	0.7%	1.1%	2.6%	-

Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

Figure 3.5: Age breakdown of Laingsburg population

Households, house types and ownership

Based on the information from the 2016 Household Community Survey there were 2861 households in the LM. The overwhelming majority of households resided in formal houses (96.5%). This is similar to the figure for the District (97.3%) and significantly higher than the figure for the Western Cape (72.2%). Only 1.6% of the households in the LM resided in shacks. In terms of ownership, 55.7% of houses are owned and fully paid off, 5.3% are owned but in the process of being paid off, 17.9% are rented, and 10.3% are occupied rent free.

The high percentage of formal houses coupled with high level of homeownership reflects a stable, middle class community. However, as indicated below, household income levels are low.

Based on the information from the 2016 Community Household Survey 31.8% of the households in the LM are headed by females. Although the figures are lower than the CKD (40.8%) and Western Cape (38%), the relatively high number of female-headed households at the local municipal level reflects the lack on formal employment and economic opportunities in the LM. As a result, job seekers from the LM need to seek work in the larger centres, specifically Cape Town and Winelands area. The majority of the job seekers are likely to be males. This is due to traditional rural patriarchal societies where the role of the women is usually linked to maintaining the house and raising the children, while the men tend to be the ones that migrate to other areas in search of employment.

Household income

Based on the data from the 2011 Census, 5.5% of the population of the LM had no formal income, 2% earned less than R 4 800, 2.8% earned between R 5 000 and R 10 000 per annum, 20.7% between R 10 000 and R 20 000 per annum and 25.3% between R 20 000 and R 40 000 per annum (2016).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 56.3% of the households in the LM live close to or below the poverty line. The figures for the CKD and Western Cape were 62.9% and 50.1% respectively. The low-income levels reflect the limited employment opportunities and dependence on the agricultural sector. 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 LM. This in turn impacts on the ability of the LM to maintain and provide services.

Employment

The 2019 Socio-Economic Profile for the Laingsburg Municipality notes that the unemployment rate in the LM has fluctuated between 14.8 and 17.7 % over the last 10 years (Figure 3.6). Unemployment in Laingsburg area started at 15.9 per cent in 2008, rising steadily to 17.7% in 2010 and then dropping to 15.6% in 2018. The unemployment in the LM in 2018 (15.6%) is lower than the figure for the CKD (20.7%) and Western Cape (17.7%).

Unemployment Rates for the Western Cape (%)											
Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Laingsburg	15.9	16.8	17.7	17.5	17.0	16.2	16.4	14.8	15.4	16.0	15.6
Central Karoo District	20.5	21.4	22.3	22.1	21.6	20.9	21.0	19.6	20.5	21.2	20.7
Western Cape	12.7	14.0	15.4	15.5	15.6	15.5	15.9	15.9	17.1	17.8	17.7

Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

Figure 3.6: Unemployment rates for Laingsburg Municipality

Education

Education levels in the LM are reflected by the percentage of the population under the age of 20 that have no education, the percentage that have some primary and or have completed primary school, and the percentage that have passed grade 12 (matric). Based on the 2016 Household Community Survey, 9.2% of the population over the age of 20 had not formal education. This is significantly higher than the figures for Central Karoo (5.8%) and Western Cape (2.4%) and reflects the rural nature of large parts of the LM. The percentage with some primary and primary school was 14.4%, compared to 14.1% and 8.2% for the Central Karoo District and Western Cape Province, respectively. The percentage with matric was 26.2%, which compares favourably with the 29.9% for the CKD, but is lower than the 35.2% for the Western Cape (Table 3.1).

The education levels in the LM are therefore lower than the Western Cape Provincial figures. This is understandable given the small size of the towns and the large rural nature of the area. However, of interest the matric pass rates in the LM are the highest in the KD. The matric pass rate in the LM was 80.6% in 2018, compared to 79.2% and 71.2 in the Beaufort West and Prince Albert Municipalities, respectively. However, the rate in 2016 was 90.3%. The decrease in the matric pass rate in the LM is an indicator of potential decrease in the quality of education on the area. The drop in the pass rate also reduces the chances of learners gaining access to higher education and employment opportunities. The limited opportunities for gaining access to higher education are reflected in the low percentage of the population in the LM over the age of 20 with undergraduate (0.2%) and post graduate qualifications (0.8%). This is likely to be a function of both the quality of the education available and limited ability of the majority of households to afford the costs associated with accessing tertiary education. As indicated in the data on household income, 56.3% percent of households earn less than R 4000 per month.

Table 3.1: Population by highest educational level

Column	Laingsburg		Central Karoo		Western Cape	
None	9.2%	554	5.8%	2,731	2.4%	99,112
Other	2.1%	124	0.6%	278	0.6%	22,923
Some primary	14.4%	873	14.1%	6,608	8.2%	341,614
Primary	6.6%	398	6.6%	3,110	4.9%	203,457
Some secondary	39.3%	2,377	38.9%	18,272	36.4%	1,510,481
Grade 12 (Matric)	26.3%	1,589	29.9%	14,084	35.2%	1,461,693
Undergrad	0.2%	11	1.3%	630	4.9%	201,354
Post-grad	0.8%	49	1.1%	523	4.5%	187,570
N/A	1.3%	79	1.7%	802	2.9%	120,830

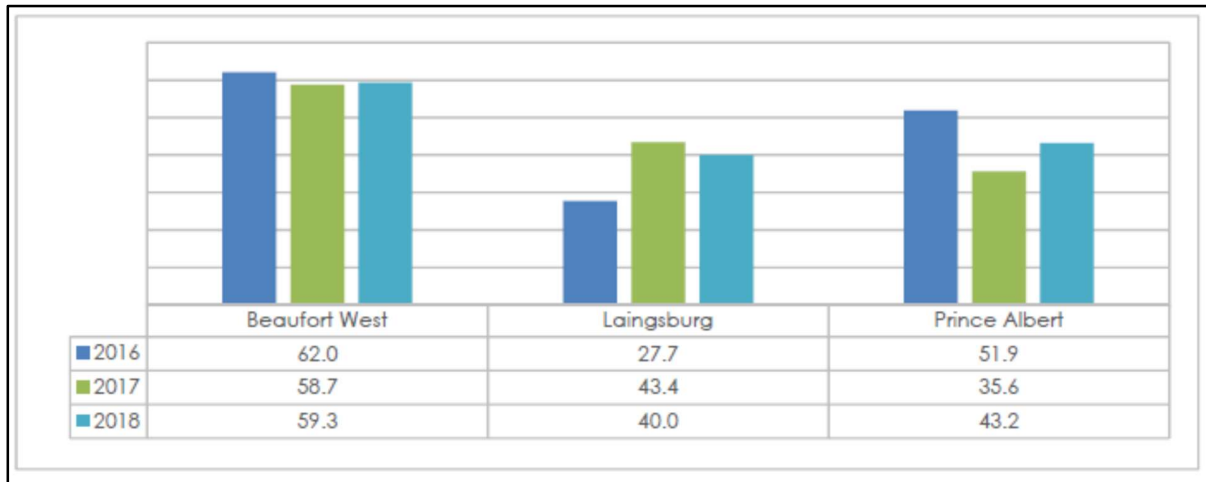
Source: Wazimap: 2016 Household Community Survey

Learner retention

The learner retention rates⁹, which reflect the number of students that start Grade 12 as a percentage of the number of students that enrolled in Grade 10, are also a cause for concern. Although the retention rates in the LM improved between 2016 (27.7%) and 2018 (40.0%), the 2018 figure still implies that the majority (60%) of the students that started Grade 10 did not make it or enrol in Grade 12. The average for the CKD in 2018 was 55.8% (Figure 3.7).

⁹ Also referred to as the drop-out rate.

The reasons why learners drop out of school vary but are strongly linked to a range of interrelated socio-economic factors, including lack of disposable income, lack for support from parents, and the perception that a matric qualification will not enhance the chance of finding employment.



Source: 2019 Socio-Economic Profile for the Laingsburg Municipality
Figure 3.7: Learner retention for Laingsburg Municipality

3.3.2 Municipal services

Electricity

Based on the information from the 2016 Community Survey 98.6% of households in the LM had access to electricity. Of this total 84.8% had in-house prepaid meters, while 8% have conventional in-house meters, and 3% had solar power. Only 1.4% of households did not have access to electricity, this is similar to the figures for the CKD (1.29%) and Western Cape (1.85%). Based on the 2016 Community Survey most of the households in the LM (92.8%) are supplied with electricity by the LM (Table 3.2).

Table 3.2: Population by electricity access

Column	Laingsburg		Central Karoo		Western Cape	
In-house prepaid meter	84.8%	7,541	88.7%	65,855	77.5%	4,868,696
In-house conventional meter	8%	708	8%	5,925	16.9%	1,059,707
Solar home system	3%	263	0.8%	619	0.1%	4,781
Other	2.2%	195	0.9%	673	0.6%	40,039

Source: Wazimap: 2016 Household Community Survey

Access to water

Based on the information from the 2016 Community Survey 89.4% of households were supplied by a regional or local service provider. In terms of access to water, 94.5% of the households in the LM has access to water. Of this total 63.3% had piped water inside their houses, while 31.2% relied on piped water inside the yard. The figures piped water supplied inside of homes for the CKD and Western Cape were 75.7% and 80.7% respectively. The

figures for the LM are therefore lower than the district and provincial levels. The figure for water supplied by boreholes (4.7%) is higher than both the CKD (1.1%) and Western Cape (0.2%). This reflects the rural character of large areas of the LM. Based on the 2016 Community Survey most of the households in the LM (94.5%) have access to potable water, with 89.4% being supplied by a regional or local service provider (Table 3.3).

Table 3.3: Population by water source

Column	Laingsburg		Central Karoo		Western Cape	
Piped water inside house	63.3%	5,632	75.7%	56,235	80.7%	5,069,195
Piped water inside yard	31.2%	2,773	20.5%	15,220	10.8%	680,929
Borehole in yard	4.7%	414	1.1%	841	0.2%	12,143
Borehole outside yard	0.5%	48	0.4%	307	0.1%	6,916
Other	0.3%	29	2.2%	1,644	8.1%	510,547

Source: Wazimap: 2016 Household Community Survey

Sanitation

Based on the information from the 2016 Community Survey, 97.7% of households have access to flush toilets, while 1.5% rely on bucket toilets and only 0.3% reported no access to toilet facilities. The access to flush toilets is marginally higher than the CKD (97.5%) and Western Cape (95/6%). The figures for no access are also lower than CKD (0.4%) and Western Cape (0.7%). Based on the 2016 Community Survey most of the households in the LM (97.7%) have access to flush toilet facilities, with only 0.3% reporting having no access to toilet facilities (Table 3.4).

Table 3.4: Population by toilet facilities

Column	Laingsburg		Central Karoo		Western Cape	
Flush toilet	97.7%	8,693	97.5%	72,372	95.6%	5,951,904
Bucket toilet	1.5%	129	0.8%	594	2.9%	180,258
Other	0.5%	42	0.7%	511	0.4%	24,692
None	0.3%	24	0.4%	274	0.7%	45,605

Source: Wazimap: 2016 Household Community Survey

Refuse collection

Based on the information from the 2016 Community Survey, 89.9% of households have their refuse collected by a local authority or private company on a regular basis, while 9.2% rely on their own waste disposal dump. The relatively high number that dispose of their waste at their own dump reflects the rural nature of the LM. The majority of these households are likely to be associated with farms in the LM. Based on the 2016 Community Survey most of the households in the LM (89.7%) have their waste collected on a regular basis by a service provider (Table 3.5).

Table 3.5: Population by refuse disposal

Column	Laingsburg		Central Karoo		Western Cape	
Service provider (regularly)	89.2%	7,937	93.9%	69,696	88.7%	5,570,202
Own dump	9.2%	814	3.8%	2,841	2%	125,124
Service provider (not regularly)	0.8%	70	0.5%	374	3%	187,367
Communal dump	0.6%	49	0.6%	450	1.5%	95,488
Other	0.3%	26	1.2%	888	4.8%	301,550

Source: Wazimap: 2016 Household Community Survey

In summary, based on the 2016 Community Survey the service levels in the LM can be describe as high. In this regard 92.8% of households are supplied with electricity, 94.5% have access to potable water, with 89.4% being supplied by a regional or local service provider, 97.7% have access to flush toilet facilities, with only 0.3% reporting having no access to toilet facilities, and 89.7% have their waste collected on a regular basis by a service provider.

3.3.3 Education and health care facilities

Education facilities

In terms of school facilities, there are four primary schools in the LM. Two are located in Laingsburg, one Matjiesfontein and one in Vleiland. Three of the primary schools are government schools and one is private. The majority of the students from the private school complete their schooling at schools located outside of the LM. There is only secondary school in Laingsburg, the Laingsburg High School. The IDP notes that the Laingsburg High School is under financial pressure. Many of the scholars that attend the school are unable to pay school fees as the majority are from previously disadvantaged areas. Despite this the LM achieved a 100% matric pass rate in 2020. However, as indicated under learner rendition, there is a high drop-out rate between Grade 10 and 12.

The Laingsburg High School was recently declared a non-fee school which reflects the low household income and high poverty levels in the area. Due to staff shortages the high school does not offer maths and science. Pupils that wish to study maths and science therefore have to attend schools in Touws River or Worcester. This requires them to become borders which increases the costs to parents.

Of the four government schools, 50% (2) were equipped with libraries in 2018. However, the shortage of funds as schools, such as the Laingsburg High School, is likely to impact on the quality of the libraries. There are no Further Education and Training (FET) colleges in Laingsburg with the closest one is located in Worcester, which falls outside the Central Karoo District. Further away is Beaufort West, Oudtshoorn, Paarl, Stellenbosch, George and Mosselbay.

Health care facilities

Access to healthcare services is a basic human right and one that is directly affected by the number and spread of facilities within their geographical area. In terms of healthcare facilities, Laingsburg had 3 primary healthcare clinics (PHC) in 2018, which consisted of 1 fixed and 2 mobile clinics. In addition, there is also a district hospital, the Laingsburg District Hospital,

located in Laingsburg. There are also three Tuberculosis and one Antiretroviral and 3 clinics/sites (Table 3.6).

There are no health facilities located in the area to the north of the N1 and none in the other rural areas. The rural areas are served by mobile clinic routes. The Department of Provincial Health has identified 17 mobile clinic routes within the LM. At least one route is covered per day, sometimes even two. In the event of medical emergencies patients are transported to either to Laingsburg or the clinic in Matjiesfontein. The LM had 1 ambulance per 10 000 inhabitants in 2018, which is on par with the CKD average of 1 ambulance per 10 000 people. However, the large distances associated with the isolated rural communities impacts on the efficiency of the ambulance services within the LM.

Table 3.6: Health facilities in Laingsburg Municipality

Area	PHC Clinics		Community Health Centres	Community Day Centres	Hospitals		Treatment Sites	
	Fixed	Non-fixed			District	Regional	ART Clinics	TB Clinics
Laingsburg	1	2	0	0	1	0	1	3
Central Karoo District	8	10	0	1	4	0	12	22

Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

Child health

Child health is a key indicator of well-being and potential needs. The United Nations Sustainable Development Goals (SDGs) aim to end preventable deaths of new-borns and children under 5 years of age by 2030, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1 000 live births and under-5 mortalities to at least as low as 25 per 1 000 live births (Source: UN SDG's). Key criteria used to measure child health include immunisation rates¹⁰, percentage of malnourished children¹¹, neonatal mortality rate¹² and birth weight¹³.

The immunisation coverage rate for children under the age of one in the LM dropped from 80.7% in 2017/18 to 59.1% in 2018/19. The CKD average for 2018/19 was 71.3%. The drop

¹⁰ **Immunisation:** *The immunisation rate is calculated as the number of children immunised as a percentage of the total number of children less than one year of age. Immunisation protects both adults and children against preventable infectious diseases. Low immunisation rates speak to the need for parents to understand the critical importance of immunisation, as well as the need to encourage parents to have their young children immunised.*

¹¹ **Malnutrition:** *Expressed as the number of malnourished children under five years per 100 000 people. Malnutrition (either under- or over-nutrition) refers to the condition whereby an individual does not receive adequate amounts or receives excessive amounts of nutrients.*

¹² **Neonatal mortality rate:** *Measured as the number of neonates dying before reaching 28 days of age, per 1 000 live births in a given year. The first 28 days of life (neonatal period) represent the most vulnerable time for a child's survival. The Province's target for 2019 is 6.0 per 1 000 live births.*

¹³ **Low birth weight:** *Percentage of all babies born in facility that weighed less than 2 500 g. Low birth weight is associated with a range of both short- and long-term consequences.*

on the immunisation rate is a concern. However, the number of malnourished children under five years (per 100 000) in 2017/18 was 1.3. This decreased to zero in 2018/19. The neonatal mortality rate (NMR) (deaths per 1 000 live births before 28 days of life) for the Laingsburg municipal area remained at zero deaths in 2017/18 and 2018/19. The low-birth weight indicator for Laingsburg increased slightly from 25.7% in 2017/18 to 26.6 % in 2018/19. The decrease in the number of malnourished children under five years and NMR to zero in 2018/19 represents a positive improvement in child health and supports the achievement of SDGs. Although the low birth rate has increased, this has not impacted on the NMR (Table 3.7).

Table 3.7: Child health statistics for Laingsburg Municipality

Area	Immunisation Rate		Malnutrition		Neonatal Mortality Rate		Low birth weight	
	2017/18	2018/19	2017/18	2018/19	2017/18	2018/19	2017/18	2018/19
Laingsburg	80.7	59.1	1.3	0.0	0.0	0.0	25.7	26.6
Central Karoo District	73.0	71.3	5.6	3.8	19.9	12.1	21.9	23.4

Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

3.4 DEMOGRAPHIC OVERVIEW KAROO HOOGLAND MUNICIPALITY

An overview of the Karoo Hoogland Municipality is provided given that the site borders on to the southern boundary of the municipality and that the town of Sutherland may be impacted by the proposed expansion.

3.4.1 Demographics

Population

Based on the 2016 Community Household Survey the population of the KH was 13 010. In terms of race groups, Coloureds made up 79.3%, followed by Whites (19.7%) and Black Africans (0.7%). The main first language spoken in the KH was Afrikaans (98.5%), followed by IsiXhosa (0.4%) and English (0.3%) (Community Household Survey 2016).

In terms of age, the 2016 Household Community Survey found that 31% of the population were under the age of 18, 58% were between 18 and 64, and the remaining 11% were 65 and older (Table 3.8). The KH therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.

Table 3.8: Population by age category

Column	Karoo Hoogland		Namakwa		Northern Cape	
Under 18	31%	4,034	29.3%	33,776	35.7%	426,616
18 to 64	58%	7,546	61.2%	70,705	57.7%	688,405
65 and over	11%	1,429	9.5%	11,006	6.6%	78,759

Source: Wazimap: 2016 Household Community Survey

The high percentage of young people also means that a large percentage of the population is dependent on a smaller productive sector. 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%, lower than the figure for the Northern Cape (55.7%). The dependency ratio for the KH in 2011 was 50.9%. The traditional approach is based people younger than 15 or older than 64. The 2016 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 still likely to be at school or dependent upon their parents or other family members).

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 ratio for the LM (2016) was 72%. This figure is significantly higher than the national, provincial, and municipal levels in 2011. The higher dependency ratio reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality.

Households, house types and ownership

Based on the information from the 2016 Household Community Survey there were 4621 households in the KH. The overwhelming majority of households resided in formal houses (97.6%). This is higher than the figure for the District (88.4%) and significantly higher than the figure for the Northern Cape (74.4%). Only 0.4% of the households in the KH resided in shacks, compared to 2.3% and 12.8% for the District and Province, respectively (Table 3.9). In terms of ownership, 63.6% of houses are owned and fully paid off, 4.4% are owned but in the process of being paid off and 8.5% are rented. The high percentage of formal houses coupled with high level of homeownership reflects a stable, middle class community. However, as indicated below, household income levels are low.

Table 3.9: Households by type of dwelling

Column	Karoo Hoogland		Namakwa		Northern Cape	
House	97.6%	4,506	88.4%	33,308	74.4%	263,123
Semi-detached house	1.3%	58	2.8%	1,042	1.6%	5,602
Townhouse	0.6%	29	0.1%	40	0.4%	1,375
Shack	0.4%	19	2.3%	870	12.8%	45,246
Other	0.1%	6	6.4%	2,411	10.9%	38,364

Source: Wazimap: 2016 Household Community Survey

Based on the information from the 2016 Community Household Survey 32.4% of the households in the KH are headed by females. Although the figures are lower than the ND (37.5%) and Northern Cape (38.8%), the relatively high number of female-headed households at the local municipal level reflects the lack on formal employment and economic opportunities in the KH. As a result, job seekers from the LM need to seek work in the larger

centres, specifically Cape Town and Winelands area. The majority of the job seekers are likely to be males. This is due to traditional rural patriarchal societies where the role of the women is usually linked to maintaining the house and raising the children, while the men tend to be the ones that migrate to other areas in search of employment.

Household income

Based on the data from the 2011 Census, 6.6% of the population of the KH had no formal income, 2.4% earned less than R 4 800, 5% earned between R 5 000 and R 10 000 per annum, 24.6% between R 10 000 and R 20 000 per annum and 26.2% between R 20 000 and R 40 000 per annum (2016).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 64.8% of the households in the KH live close to or below the poverty line. The figures for the ND and Northern Cape were 58.1% and 62.5% respectively. The low-income levels in the KH reflect the limited employment opportunities and dependence on the agricultural sector. 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 KH. This in turn impacts on the ability of the KH to maintain and provide services.

The low household income levels are reflected in the number of indigent households in the KH, which had 944 registered indigent households in 2016. This represents 20% of the total number of households in the KH.

Employment

Based on the 2011 Census the official unemployment figure for the KH was 8%. The figures also indicate that the majority of the population are not economically active, namely 40.4%. The unemployment figure is lower than the official unemployment rate for the ND (11.1%) and Northern Cape (14.5%). While the level of unemployed is low, this needs to be considered within in the context of the low-income levels and the dependence on the agricultural sector.

Education

Education levels in the KH are reflected by the percentage of the population under the age of 20 that have no education, the percentage that have some primary and or have completed primary school, and the percentage that have passed grade 12 (matric). Based on the 2016 Household Community Survey, 13.2% of the population over the age of 20 had not formal education. This is significantly higher than the figures for ND (4.4%) and Northern Cape (7.9%) and reflects the rural nature of large parts of the KH. The percentage with some primary and primary school was 14%, compared to 12.6% and 13.4% for the ND and Northern Cape Province, respectively. The percentage with matric was 29.2%, which was higher than the ND (27.1%) and Northern Cape (29.1%) (Table 3.10). The higher matric rates are interesting, specifically given the figure for no formal education. However, despite the higher matric pass rates, the Namakwa IDP notes that the KH has the lowest functional literacy rate in the ND. defines functional literacy as the number of people in a region that are 20 years and older and have completed at least their primary education (i.e. grade 7). Functional literacy describes the reading and writing skills that are adequate for an individual to cope with the demands of everyday life - including the demands posed in the workplace. This is contrasted with illiteracy in the strictest sense, meaning the inability to read or write.

Functional literacy enables individuals to enter the labour market and contribute towards economic growth thereby reducing poverty.

Table 3.10: Population by highest educational level

Column	Karoo Hoogland		Namakwa		Northern Cape	
None	13.2%	1,157	4.4%	3,537	7.9%	58,818
Other	0%	0	0.5%	368	0.5%	3,786
Some primary	14%	1,228	12.6%	10,083	13.4%	100,079
Primary	8.3%	732	8.1%	6,481	5.8%	43,349
Some secondary	25.4%	2,238	39.9%	31,934	36.2%	269,520
Grade 12 (Matric)	29.2%	2,572	27.1%	21,696	29.1%	216,562
Undergrad	5.6%	492	2.8%	2,255	2.6%	19,707
Post-grad	2.4%	215	1.7%	1,391	1.9%	14,354
N/A	1.9%	166	3%	2,381	2.6%	19,029

Source: Wazimap: 2016 Household Community Survey

3.4.2 Municipal services

Electricity

Based on the information from the 2016 Community Survey 96.6% of households in the LM had access to electricity. Of this total 66.7% had in-house prepaid meters, while 6.6% have conventional in-house meters, and 20.3% had solar power. Only 3.4% of households did not have access to electricity, this is marginally higher than the figures for the ND (2.2%), but higher than the figure for the Northern Cape (6.7%). Based on the 2016 Community Survey most of the households in the LM (74.3%) are supplied with electricity by the KH (Table 3.11). The high percentage of households that use solar energy reflects the rural nature of the area.

Table 3.11: Population by electricity access

Column	Karoo Hoogland		Namakwa		Northern Cape	
In-house prepaid meter	67.7%	8,809	84%	96,978	79.9%	953,855
Solar home system	20.3%	2,645	4.2%	4,873	1%	12,244
In-house conventional meter	6.6%	856	7.7%	8,865	10.5%	125,627
No access to electricity	3.4%	444	2.2%	2,571	6.7%	79,622
Other	2%	256	1.9%	2,200	1.9%	22,432

Source: Wazimap: 2016 Household Community Survey

Access to water

Based on the information from the 2016 Community Survey 69% of households were supplied by a regional or local service provider, while 30.4% relies on their own source of water. The higher percentage of households that rely on their own source of water reflects the rural nature of the area, where large distances make difficult and expensive to provide services to all areas, specifically farms. In terms of access to water, 74.9% of the households in the KH had had piped water inside their houses, while 21.4% relied on piped water inside the yard. The figures piped water supplied inside of homes for the ND and Northern Cape were 72.1% and 45.3% respectively. The figures for the KH are therefore higher than both the district and provincial levels. The figure for water supplied by boreholes (2.4%) is higher than both the ND (0.8%) and Northern Cape (1.3%). This reflects the rural character of large areas of the KH. Based on the 2016 Community Survey most of the households in the LM (99.4%) have access to potable water, with 69% being supplied by a regional or local service provider (Table 3.12).

Table 3.12: Population by water source

Column	Karoo Hoogland		Namakwa		Northern Cape	
	%	Count	%	Count	%	Count
Piped water inside house	74.9%	9,738	72.1%	83,258	45.3%	540,743
Piped water inside yard	21.4%	2,788	23.9%	27,565	34.3%	409,636
Borehole in yard	2.4%	307	0.8%	880	1.3%	15,056
Borehole outside yard	0.7%	90	1.2%	1,341	0.8%	8,981
Other	0.7%	86	2.1%	2,444	18.4%	219,364

Source: Wazimap: 2016 Household Community Survey

Sanitation

Based on the information from the 2016 Community Survey, 69.7% of households have access to flush toilets, 17.4% rely on pit toilets, 9.3% use bucket toilets, and 2.7% reported no access to toilet facilities. The access to flush toilets is significantly lower than the ND (82.3%) and marginally lower than the Northern Cape (71.6%). The figures for no access are higher than the ND (1.9%) but lower than the Northern Cape (4%). Based on the 2016 Community Survey most of the households in the KH (69.7%) have access to flush toilet facilities, with only 2.7% reporting having no access to toilet facilities (Table 3.13).

Table 3.13: Population by toilet facilities

Column	Karoo Hoogland		Namakwa		Northern Cape	
	%	Count	%	Count	%	Count
Flush toilet	69.7%	9,065	82.3%	94,056	71.6%	849,803
Pit toilet	17.4%	2,263	12.6%	14,341	19%	225,522
Bucket toilet	9.3%	1,205	2.6%	3,016	4.4%	52,084
None	2.7%	348	1.9%	2,119	4%	48,008
Other	1%	129	0.7%	768	1%	11,566

Source: Wazimap: 2016 Household Community Survey

Refuse collection

Based on the information from the 2016 Community Survey, 67.9% of households have their refuse collected by a local authority of private company on a regular basis, while 30% rely on

their own waste disposal dump. The high number of households that dispose of their waste at their own dump reflects the rural nature of the KH. The majority of these households are likely to be associated with farms in the KH. Based on the 2016 Community Survey most of the households in the LM (67.9%) have their waste collected on a regular basis by a service provider (Table 3.14). This percentage is likely to represent the majority of households located in the three towns in the KH.

Table 3.14: Population by refuse disposal

Column	Karoo Hoogland		Namakwa		Northern Cape	
Service provider (regularly)	67.9%	8,830	86.2%	99,585	64.9%	774,691
Own dump	30%	3,907	8.3%	9,540	21.5%	256,078
Other	1%	135	0.7%	783	1.9%	22,143
Service provider (not regularly)	0.5%	60	3.6%	4,171	3%	35,551

Source: Wazimap: 2016 Household Community Survey

In summary, based on the 2016 Community Survey the service levels in the KH can be describe as relatively high. In this regard 74.3% of households are supplied with electricity, while 20.3% have access to solar power, 99.4% have access to potable water, with 69% being supplied by a regional or local service provider, 69.7% have access to flush toilet facilities, with only 2.7% reporting having no access to toilet facilities, and 67.9% have their waste collected on a regular basis by a service provider. The percentages should also be considered within in the context of the rural nature of large parts of the KH. In this regard the service levels in the three towns in the KH are likely to be higher than for the entire KH.

3.4.3 Education and health care facilities

Education facilities

In terms of school facilities, each of the three towns in the KH serviced by a primary and a high school (Table 3.15). The high school in Sutherland was damaged by a fire in 2018. The Northern Cape Provincial Health Department Annual Report (2018/19) notes that the ND, which includes the KH, is one of the largest district municipalities in the Northern Cape but at the same time is home to the lowest population. Most schools in this ND are located in remote areas and a large number of them have infrastructure assets which are under-utilised. The ND also has the largest number of school hostels in the Province, due to its geographical size.

Table 3.15: Education facilities in the KH

EDUCATION FACILITIES						
Town	Pre Primary School	Primary School	Secondary School	High School	Combined School	Special School
Fraserburg	-	1	-	1	-	-
Sutherland	-	1	-	1	-	-
Williston	-	1	-	1	-	-

There are no Further Education and Training (FET) colleges in Sutherland with the closest one is located in Worcester, which is located in the Breede Valley Municipality in the Western Cape. There is also a training college in Beaufort West, which is located in the Central Karoo District Municipality.

Health care facilities

Access to healthcare services is a basic human right and one that is directly affected by the number and spread of facilities within their geographical area. The provision of health care and the associated services is a provincial function provided by the Western Cape Department of Health. The IDP notes that the services provided in the KH are not satisfactory due to shortage of doctors, ambulances as well as inferior conditions of the road infrastructure between the towns. There are 3 clinics in the municipal area, one in each of the three towns, namely Williston, Fraserburg and Sutherland. Due to the distance rural nature of the area and the distances involved, rural communities have requested mobile clinics. There is currently no resident doctor in Sutherland. There are two doctors at the clinic in Calvina (160 km). Most residents that require a doctor travel to the hospital in Worcester.

3.5 ECONOMIC OVERVIEW

3.5.1 Laingsburg Municipality¹⁴

Economic activity in the LM plays a key role in terms of creating employment opportunities and addressing poverty and human development. The ability of households to pay for services such as water, electricity, sanitation, and refuse removal is dependent upon the ability to generate income from economic activities. A slowdown or deterioration in economic activities typically results in job losses and the inability of households to pay for services, which in turn impacts on municipal revenues and the ability to provide and maintain services and municipal infrastructure.

Economic sectors

In terms of key sectors, the local economy in the LM was dominated by the agriculture, forestry and fishing which contributed 27% to Geographical Gross Domestic Product (GGDP)¹⁵ in 2017, followed by general government (18.7%) and wholesale and retail trade, catering and accommodation (13.4 %). These three sectors made up 56.7% of the LMs GGDP in 2017, estimated to be worth R425.4 million. While there was strong growth of 10.5% in the agriculture, forestry, and fishing sector in 2017, the sector was expected to contract by 2.4 % in 2018 due to the drought at the time. The local economy, like the national economy, will also have been negatively impacted by the COVID-19 pandemic and associated lockdowns during 2020 extending into 2021.

Employment

In terms of employment, the agriculture, forestry and fishing sector was the most important sector in 2017, making up 31.2% of all jobs, followed by wholesale and retail trade, catering and accommodation (19.1%), community, social and personal services (17.2%) and general government (16.1 %). The agriculture, forestry and fishing sector in the Laingsburg municipal area reported net job losses (-285) between 2008 and 2017. This is a major cause for concern given the key role played by the sector in the Laingsburg economy. The sector which reported the largest increase in jobs between 2008 and 2017 was community and, social & personal

¹⁴ Information on the local economy is based on the 2019 Socio-Economic Profile of the LM prepared by the Western Cape Provincial Government.

¹⁵ Geographical Gross domestic product (GGDP) is the standard measure of the value added created through the production of goods and services in a region (the LM) during a certain period.

services (159) followed by general government (147), wholesale and retail trade, catering, and accommodation (86) and construction (85) sectors. The COVID-19 pandemic is likely to have resulted in job losses during 2020, extending into 2021.

In terms of skills levels, the labour forces in the LM in 2017 consisted mainly of semi-skilled (49.6 %) and low-skilled (34.3 %) workers. The semi-skilled and low-skilled categories (4.2%) grew notably faster than the skilled category (3.2 %) between 2014 and 2018 (Table 3.16). This is due to the relatively undeveloped nature of the local economy and limited demand for skilled workers. Of relevance to the Needs Assessment, the 2019 Socio-Economic Profile for the Laingsburg Municipality notes that the development of renewable energy facilities in the area will result in an increase in the demand for skilled labour which will create skills and development opportunities for low-skilled and semi-skilled workers.

Table 3.16: Labour forces trends in Laingsburg Municipality

Laingsburg: Trends in labour force skills, 2014 - 2018				
Formal employment by skill	Skill level contribution (%)	Average growth (%)	Number of jobs	
	2017	2014 – 2018e	2017	2018e
Skilled	16.1	3.2	380	392
Semi-skilled	49.6	4.2	1 168	1 198
Low-skilled	34.3	4.2	809	822
Total Laingsburg	100.0	4.0	2 357	2 412

Source: 2019 Socio-Economic Profile for the Laingsburg Municipality

3.5.2 Karoo Hoogland Municipality¹⁶

Economic activity in the KH plays a key role in terms of creating employment opportunities and addressing poverty and human development. The ability of households to pay for services such as water, electricity, sanitation, and refuse removal is dependent upon the ability to generate income from economic activities. A slowdown or deterioration in economic activities typically results in job losses and the inability of households to pay for services, which in turn impacts on municipal revenues and the ability to provide and maintain services and municipal infrastructure.

Economic sectors

In terms of key sectors, the local economy in the KH was dominated by the agriculture, forestry and fishing which contributed 34% to Gross Value Added (GVA)¹⁷ in 2017, followed by Community services (21%), trade (17%) and transport (12%). The sectors that contributed the least were the mining (0%), electricity (1%) and manufacturing (1%) (Figure 3.8).

¹⁶ Information on the local economy is based on the 2019 Socio-Economic Profile of the LM prepared by the Western Cape Provincial Government.

¹⁷ Gross value added (GVA) is an economic productivity metric that measures the contribution of a corporate subsidiary, company, or municipality to an economy, producer, sector, or region. Gross value added (GVA) is the value addition done to a product resulting in the production of final product whereas Gross Domestic Product (GDP) is the total value of products produced in the country.

The Gross Domestic Product (GDP) growth in KH has been fairly consistent over the years since 1996 till 2014. The rate ranges from nearly 2, 2% in 2005 to 0.02% in 1998. The periods when droughts or other factors have played a part are reflected by periodic declines in 1998, 2002, 2006, 2015. These effects are due to the dominant role played by the agriculture and community services sector. On average the growth over the period was 0,9% which shows the consistent contribution by the agriculture sector over this time period. The steepest decline was experienced during 2005 and 2015 during drought years. The local economy, like the national economy, will also have been negatively impacted by the COVID-19 pandemic and associated lockdowns during 2020 extending into 2021.

Employment

In terms of employment, the agriculture sector was the most important sector in 2015, making up 33% of all jobs, followed community services (32%), trade (14%), households (11%), and finance (6%). The COVID-19 pandemic is likely to have resulted in job losses during 2020, extending into 2021. The reliance of the KH on the agriculture sector also makes the KH vulnerable to droughts and fluctuations in commodity prices. Added to this the community services sector which accounts for 32% of all jobs is associated with reliance on municipal and government aid and functions.

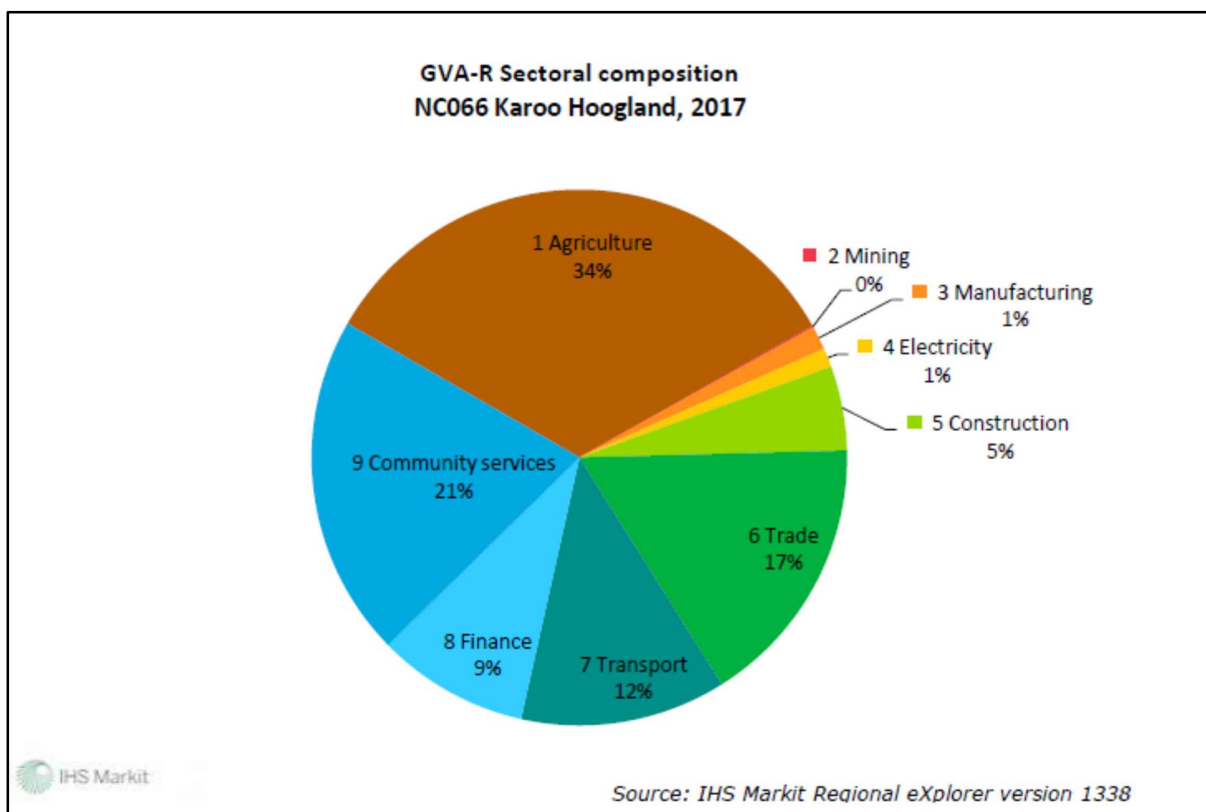


Figure 3.8: Key economic sectors in the KH

3.6 OVERVIEW OF STUDY AREA

3.6.1 Introduction

The proposed Esizayo WEF expansion site is located approximately 27 km (linear) north of the N1 north of the small town of Matjiesfontein (Figure 3.9). The site is located in the Western Cape Province (WCP), immediately to the south of its boundary with the Northern Cape Province (NCP). The town of Laingsburg (Laingsburg Municipality), located approximately 27.5km to the south-east, is the nearest large settlement. Sutherland (Karoo Hoogland Municipality, NCP) is located approximately 60 km to the north.

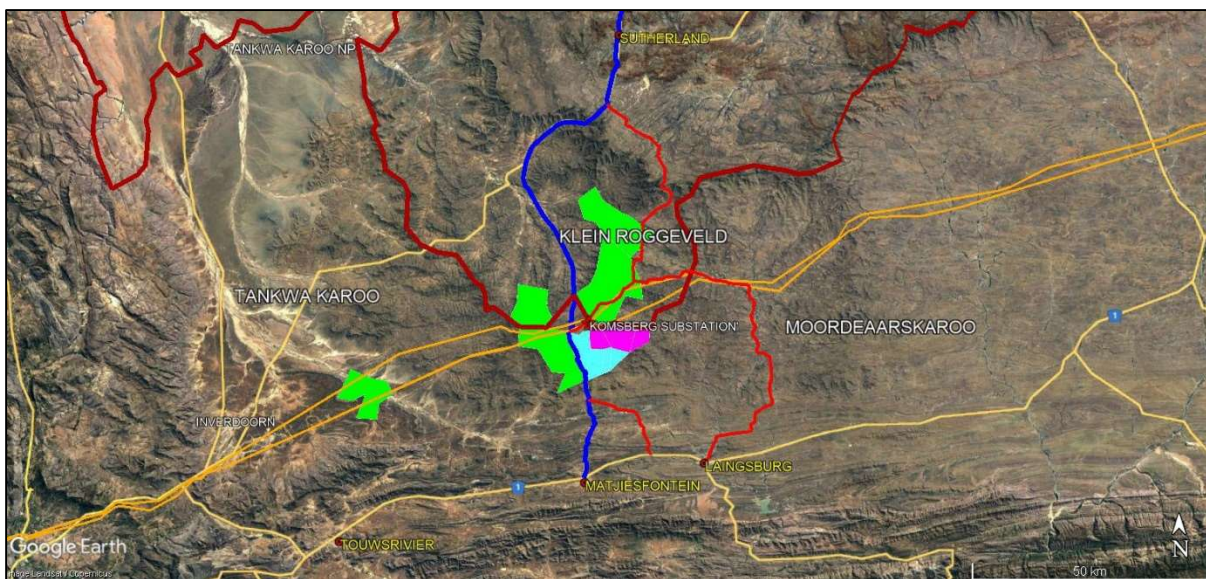


Figure 3.9: Location of site properties (pink fill) in relation to the provincial boundary (dark red), the R354 (dark blue), study area public gravel roads (red), and existing Eskom 400 kV and 765 kV lines (orange). Also indicated are operational WEFs (green fill) and the approved portion of the Esizayo WEF (light blue).

The study area is accessed from the R354 between the N1 (near Matjiesfontein) and Sutherland. The site properties are accessed via the Komsberg road, a public gravel road which provides an alternative to a portion of the R354 (via the Klein Roggeveld) (Photograph 3.1).

The broader region consists of arid veld. The economy is traditionally based on sheep farming. The study area is located south of the Great Escarpment, in what is traditionally referred to as the Klein Roggeveld. The Klein Roggeveld is located to the south of the Komsberg (mountain). It is located at mid-elevation, and constitutes the eastern extremity of the winter rainfall area. It is flanked by the Tanqua Karoo to the west, and the Moordenaarskaro to the east. The area located to the north of the escarpment is referred to as the Roggeveld (summer rainfall). Sutherland on the escarpment is well-known for its bitterly cold winters, while the Tanqua Karoo and Moordenaarskaro are well-known for their unbearably hot summers. Most farming operations in the region consist of a number of (owned or rented) properties, often in different areas to best make use of regional differences in elevation and rainfall.



Photograph 3.1: Intersection of the R354 and Komsberg gravel road, viewed from the south. The power lines are 400 kV and 765 kV lines feeding into Komsberg substation.

The settlement pattern is nevertheless sparse, with farmstead clusters typically located >5 km apart. Due to the nature of farming operations, associated permanent employment opportunities are limited. Farm labourers typically reside on the main farms, while small numbers of caretaker staff would reside on secondary farms (essentially stock posts).

Extensive grazing remains the primary land use. Sheep farming predominates, but some properties also carry smaller herds of cattle. Carrying capacities are low - 3-6 ha is required for one small-stock unit (sheep), and properties are typically extensive, many including mountainous/ hilly terrain. Much of the Karroid scrub-dominated veld is palatable, with a low incidence of toxicity. The Karroid veld is very sensitive to disturbance, and typically takes decades to recover. Denuded areas are very susceptible to erosion. Many operations grow fodder crops under irrigation, but mainly for own use. Many also cultivate vegetable seed on contract, but mainly on properties in the more isolated Tanqua Karoo. Cropped areas are relatively small, typically limited to valley floors near sources of water.

Game has been introduced onto a number of study area properties, but none for commercial purposes. Local tourism is limited to self-catering guest accommodation on a number of working farms in the area, namely on Fortuin, Saaiplaas and De Kom. The natural landscape is the greatest scenic amenity, with a number of vantage points located along the Komsberg gravel road. The scenic portion of the R354 is mainly associated with the Verlatekloof pass south on the escarpment, i.e., not the study area.

Eskom's Komsberg substation is located along the Komsberg Rd, approximately 4.5 km (linear) east of the R354 intersection (Photograph 3.2). Two 400 kV and a 765 kV Eskom lines currently feed into Komsberg. The corridor segment between the intersection and the substation essentially follows the Komsberg Road alignment.



Photograph 3.2: Eskom's Komsberg substation, viewed from the entrance along the Komsberg Road.

The Klein Roggeveld and southern Tanqua Karoo fall within the Komsberg REDZ. Four operational WEFs are currently located within this REDZ, three of which – Roggeveld, Karusa and Soetwater – are located in close proximity to the site (Photograph 3.3). Two additional WEFs – Brand Valley and Rietkloof – were awarded preferred bidder status in 2021.



Photograph 3.3: Entrance to Roggeveld WEF off the R354 (Swartland farm).

Environmental approvals (and some amended approvals) have also been issued for a number of facilities, including Esizayo, the Karreebosch WEF to the west of the R354, and the Gunsfontein WEF to the north of the Komsberg. Two further WEFs are currently proposed to the south of the Komsberg, namely Maralla West and Maralla East.

The Esizayo WEF was approved on properties located adjacent to the west and south of the site in 2017 (DEA Reference: 14/12/16/3/3/2/967). A total of 36 turbines have been approved on 3 properties. An unsuccessful BID was submitted in 2021. The Esizayo Expansion Project seeks to add up to 23 turbines on three additional properties, viz. Aanstoot 72/2, and Leeuwfontein 71/RE and 71/1. The new turbines would have hub heights of up to 150 m. Power generated by the additional turbines would be fed into a collector substation envisaged on Aurora 285 (part of the approved WEF portion), and from there into the grid via a new N-

S aligned 132 kV power line to Eskom’s Komsberg substation (Figure 3.10). Proposed access is unclear, but assumed via the approved portion of Esizayo.

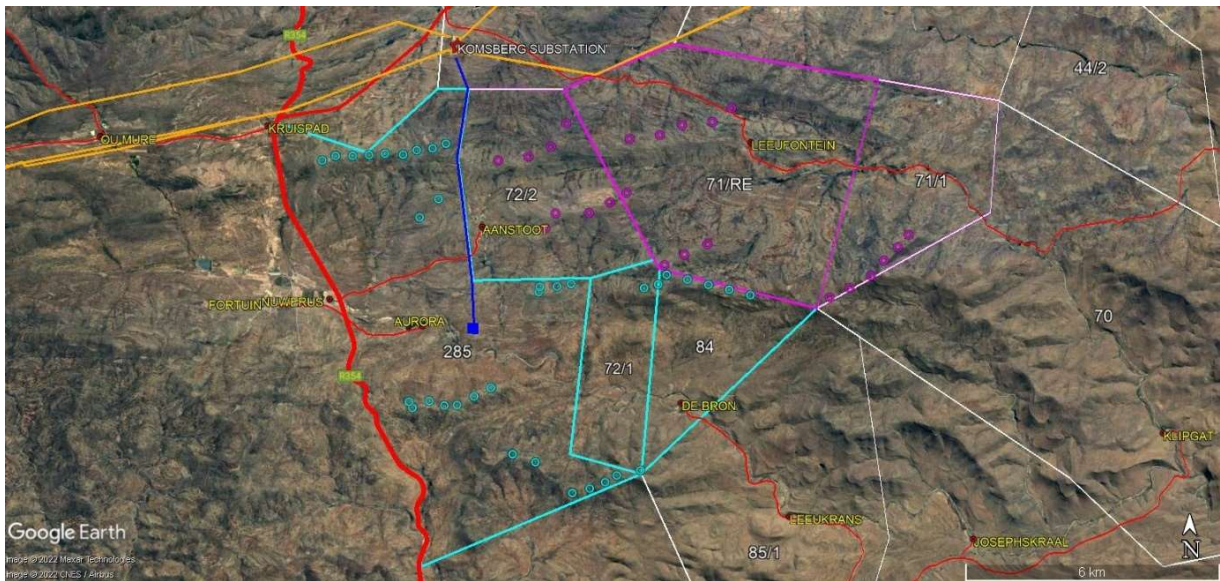


Figure 3.10: Expansion site properties (pink) and proposed turbines (pink circles) in relation to the approved Esizayo WEF and turbines (light blue) and envisaged substation and 132 kV powerline. Also indicated are adjacent properties (white), study area public gravel roads (red), and existing Eskom 400 kV and 765 kV lines (orange).

3.6.2 Directly affected properties

The site consists of three properties owned by two land owners (Table 3.17). All the properties are used exclusively for seasonal grazing by one farming operation. Dwellings are located on two properties, but none are inhabited. No farm workers reside on the properties. None of the properties are directly accessible from public roads (Figure 3.11).

Table 3.17: Potentially affected properties

PROPERTY	OWNER	LAND USE	COMMENT
Aanstoot 72/2	Mr Kallie Freysen	Winter grazing	Part of larger farming operation based in Moordenaarskaroo; Dwelling on farm uninhabited
Leeuwfontein 71/RE	Mr Jacques le Roux	Winter grazing	Leased out to Mr Kallie Freysen for grazing; Dwelling on property uninhabitable
Leeuwfontein 71/1		Winter grazing	Leased out to Mr Kallie Freysen for grazing

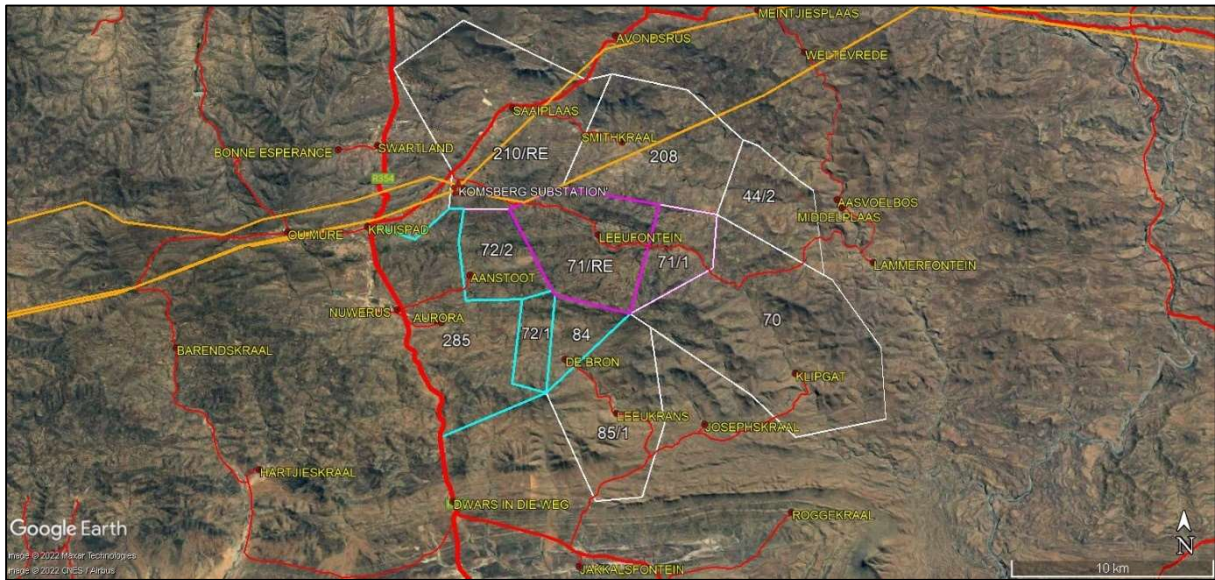


Figure 3.11: Site properties (pink), approved Esizayo WEF properties (blue) and other adjacent properties (white) located in relation to road network (red) and existing transmission lines (orange).

Aanstoot 72/2

Aanstoot 72/2 (1525.5 ha) is owned by Mr Kallie Freysen and forms part of a larger farming operation based in the Moordenaars Karoo closer to Laingsburg. A dwelling is located on the property, but it is not inhabited. The property is used exclusively for winter grazing (Freysen, pers. comm). Aanstoot 72/2 is accessed from the R354 via a servitude road across Aurora (Hanekom, approved portion Esizayo) (Photograph 3.4). No transmission lines or other major service industrial infrastructure are currently located on the property. Eight turbines are proposed on the property.



Photograph 3.4: Access road to Aanstoot Portion 2 from the R354 via a ~3 km portion of Aurora.

Leeuwfontein

Leeuwfontein 71/RE and 71/1 (4321 ha combined) is owned by Mr Jacques le Roux who lives in Worcester and leases the properties to Mr Kallie Freysen (Aanstoot) for winter grazing, i.e., as part of a larger Moordenaars Karoo-based operation. The farmstead on Leeuwfontein 71/RE is in a dilapidated state and no longer considered inhabitable (le Roux, pers. comm). Leeuwfontein is accessed from the Komsberg gravel Road via a servitude across Saaiplaas (Mr Conradie). No transmission lines or other major service industrial infrastructure are currently located on the properties. Eight turbines are proposed on Leeuwfontein 71/RE, and six on 71/1.

3.6.3 Adjacent properties

Eight properties owed by seven land owners border onto the site properties (Table 3.18). Two properties, Aasvogelbosch 44/2 and Joseph's Kraal 85/1, border onto the site only by means of a shared boundary point. The relevant owners could not be established. Standvastigheid 210/RE and Smithkraal 208 located to the north of the site are located in the Northern Cape Province (NCP). With the exception of Standvastigheid 210/RE (Saaiplaas), none of the properties appear to be permanently inhabited.

Table 3.18: Potentially affected properties

PROPERTY	OWNER	LAND USE	COMMENT
Standvastigheid 210/RE	Mr. Francois Conradie	Grazing; Cropping; Guest farm	Base farm of 'Saaiplaas' farming operation; Owner and labourers reside on farm; Guest accommodation facility; Part of operational Karusa WEF
Smithkraal 208	Linksfeld Property Ltd	Assumed grazing	Owners based in Cape Town; Dwelling on farm appears uninhabited
Aasvogelbosch 44/2	???	Assumed grazing	Cadastral point boundary only; No dwellings on property
Klipgat 70	Mr Izak van der Vyfer	Grazing	Part of larger farming operation located in Moordenaarskaroo; Dwelling on property not inhabited
Joseph's Kraal 85/01	???	Assumed grazing	Cadastral point boundary only; Dwelling appears uninhabited
Farm 84	Mr Japie van Dyk	Vacant	Part of approved Esizayo WEF; Dwelling not inhabited
Aanstoot 72/1		Vacant	Part of approved Esizayo WEF
Aurora 285	Mr Gielie Hanekom	Grazing; Cropping	Part of larger operation based on De Kom; Dwelling leased out; Part of approved Esizayo WEF

Standvastigheid 210/RE

Standvastigheid 210/RE (Saaiplaas) is owned by Mr Francois Conradie and is the base farm for a multi-property farming operation. Mr Conradie and his labour force live on Saaiplaas. The historic farmstead and a self-catering guest accommodation facility are located directly along the Komsberg Road (Photograph 3.5). A detour has recently been constructed to skirt these areas to the east. Operations consist of sheep farming, supplemented by irrigated fodder and vegetable seed cropping. The guest accommodation facility has been fully booked out to contractors since the start of WEF construction activities in the area, and is still fully booked for the foreseeable future.



Photograph 3.5: Saaiplaas farm yard seen across a cropped area from the new detour road on the Komsberg road with wind turbine visible in the background right

Infrastructure associated with the operational Karusa WEF (including a number of turbines) are located on Saaiplaas (Photograph 3.5). Komsberg substation is located on a subdivision of Standvastigheid, essentially occupying the extreme SW portion of the property. Two 400 kV lines and one 765 line currently feed in and out of Komsberg across Saaiplaas in two corridors. The 132kV lines for both the Karusa and Soetwater projects link into Komsberg via Standvastigheid 210/RE. The Esizayo WEF is also envisaged to link into Komsberg via a portion of the property. The nearest Esizayo expansion turbine is proposed 800 m south of the boundary, and 5.6, 5.7 km and 5.9 km to the south of the guest accommodation facility, workers' housing and farmstead, respectively.

Smithkraal

Local landowners in the area indicated that Smithkraal has recently been acquired by new owners, understood to be a Cape Town-based company called Linksfeld Property Ltd. The owners of the company could not be traced. It is unclear whether historic grazing continues on the property, but is understood that the new owners are investigating the possibility of establishing a WEF on the property (le Roux, pers. comm). The dwelling on the property does not appear to be inhabited. Smithkraal is accessed directly from the Komsberg gravel road. A corridor containing 1 x 400 kV and 1 x 765 kV lines traverses the central portion of the property. The nearest Esizayo expansion turbine is proposed 1.3 km south of the boundary, and 4.1 km to the south of the farmstead.

Klipgat 70

Klipgat 70 is owned by Mr Izak van der Vyfer and forms part of a larger farming operation based in the Moordenaars Karoo further to the east. The property is exclusively used for grazing. The farmstead located on the property is not inhabited, but is occasionally used over weekends by private guests. Klipgat is accessed from the public gravel road which links the N1 east of Laingsburg to the R354 at Dwars in die Weg. No transmission lines or major service industrial infrastructure is located on the property. The nearest Esizayo expansion turbine is proposed 50 m north of the boundary, and 7.6 km to the north-west of the farmstead.

Aanstoot 72/1 and Farm 84

Aanstoot 72/1 and Farm 84 (De Bron) are owned by Mr Japie van Dyk who resides in Laingsburg. The properties have not been farmed for a number of years. The dwelling on De Bron is not inhabited. Mr van Dyk envisages introducing limited numbers of game for private enjoyment onto the property. The properties are accessed from the public gravel road which links the N1 east of Laingsburg to the R354 at Dwars in die Weg. No transmission lines or major service industrial infrastructure are located on the properties. Both properties form part of the approved Esizayo WEF. Three turbines have been approved on Aanstoot, and 5 on De Bron. The nearest Esizayo expansion turbine is proposed 100 m north and north-east of the boundaries of Aanstoot and De Bron, respectively, and 3.3 km to the north of the disused farmstead.

Aurora 285

Aurora is owned by Mr Gielie Hanekom and is currently farmed by his son Gido. Mr Hanekom senior is based on the family's farming operation in Stellenbosch, while Mr Hanekom Jr is based on De Kom farm in the Klein Roggeveld, one of a number of properties owned and actively farmed by the Hanekoms in the Klein Roggeveld. The Klein Roggeveld properties are used for grazing and limited irrigated fodder cropping. As indicated, the main operation is based on De Kom ~25 km (linear) to the north east. The Aurora property is used as a grazing outpost, and for the limited cropping of horse fodder for commercial purposes. A farm house is located in the central portion of the property. The dwelling is currently leased out to contractors. A permanently employed farm labourer is tenured on the property (Photographs 3.6 and 3.7).

Aurora is accessed directly from the R354. No transmission lines or major service industrial infrastructure are located on the property. Aurora forms part of the approved Esizayo WEF. Twenty-eight turbines have been approved on the property. The collector substation and most of the alignment of the envisaged 132 kV line to Komsberg substation would be located on the property. The nearest Esizayo expansion turbine is proposed 900 m to the east of the boundary, and 3.7 km to the east of the farmstead.



Photograph 3,6: irrigated horse fodder and built cluster on Aurora



Photograph 3.7: Farm house (foreground) and labourer's house (background) on Aurora

3.6.4 Relationship to receptors

As indicated, the site is located in a sparsely populated area and many of the properties are uninhabited and form part of larger farming operations. The settlement pattern (inhabitation) is mainly concentrated along the R354 and Komsberg gravel roads. Hence many of the inhabited properties located to the west and north of the site form part of existing, and or soon to be constructed or approved WEFs (see further below). Dwellings on secondary properties are generally uninhabited. Of the study properties only Saaiplaas (Standvastigheid 210/RE) and Aurora 285 are inhabited. Aurora is however essentially an outpost, while Saaiplaas is a base farm, and hence the most significant social receptor. As indicated, Saaiplaas forms part of the operational Karusa WEF, while 28 turbines have been approved on Aurora (Esizayo). Public roads like the R354 and Komsberg gravel road are already affected by numerous proximate turbines.

Table 3.19: Overview of affected properties in relation to proposed Esizayo WEF Expansion turbines

PROPERTY	ACCESS	HOUSES	COMMENT
Aanstoot 72/2	R354	1.5 km	Property uninhabited; 8 x Esizayo Expansion turbines proposed
Leeuwfontein 71/RE	Komsberg	900 m	Property uninhabited; 8 x Esizayo Expansion turbines proposed
Leeuwfontein 71/1	Komsberg	n.a.	Property uninhabited; 6 x Esizayo Expansion turbines proposed
Standvastigheid 210/RE	Komsberg	5.6 km	Permanently inhabited; Part of operational Karusa WEF; Traversed by 765 kV, 400 kV, and 132 kV lines
Smithkraal 208	Komsberg	4.1 km	Property likely uninhabited; Traversed by 1 x 765 kV; 1 x 400 kV lines
Aasvogelbosch 44/2	Komsberg	n.a.	Property uninhabited;
Klipgat 70	R354-N1	7.6 km	Property uninhabited;
Joseph's Kraal 85/01	R354-N1	5.2 km	Property likely uninhabited;
Farm 84	R354-N1	3.3 km	Property uninhabited 5 x Esizayo turbines (approved)
Aanstoot 72/1	R354-N1	n.a.	Property uninhabited; 3 x Esizayo turbines (approved)

Aurora 285	R354	3.7 km	Farmstead leased out; 1 resident worker; 28 x Esizayo turbines (approved)
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3.6.5 Location of other renewable energy facilities

The study area is located within the Komsberg REDZ and a large number of renewable energy facilities (REFs), specifically WEFs, have been proposed in the region since 2010. The DFF&E’s renewable energy applications website (February 2022 update) indicates an almost continuous band of historic and current applications stretching over 130 km (linear) from the vicinity of Kappa substation in the south-west to north-east of Eskom’s small Roggeveld substation in the north-east (Figure 3.12). A total of 39 WEF projects were submitted during Bid Round 5 (closed 16 August 2021). Of these, 11 were located within the Komsberg REDZ – 5 in the Ceres/ Tankwa Karoo, and 6 in the Klein Roggeveld. The focus below is on operational WEFs and projects which submitted bids in 2021 and are located with a 35 km radius of the site.

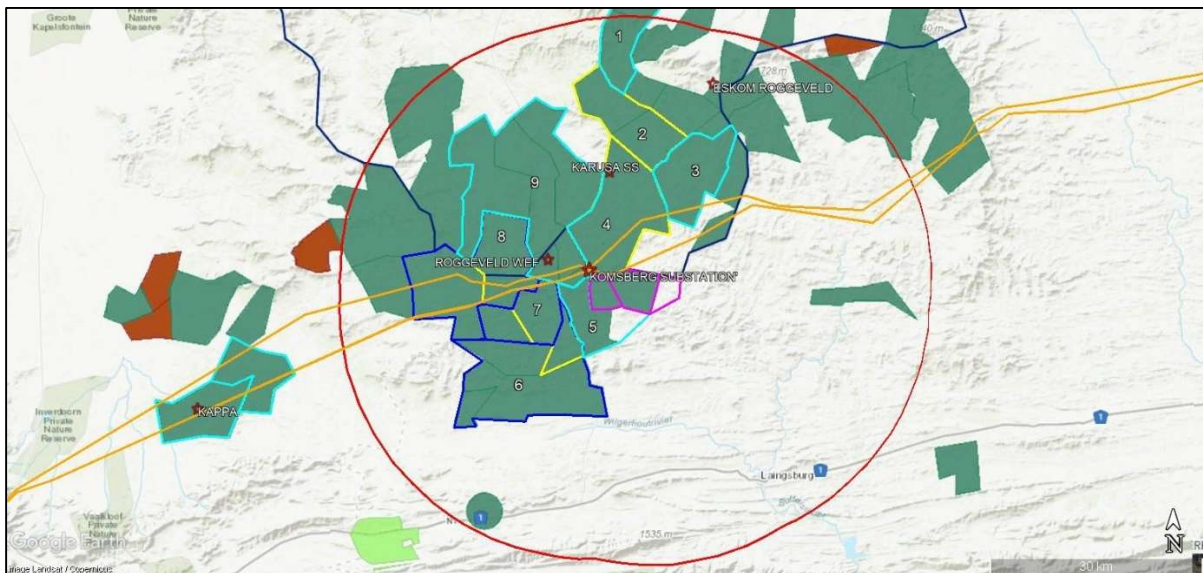


Figure 3.12: Site (pink outline) in relation to operational WEFs (yellow), WEF projects which achieved financial closure in 2021 (dark blue), and projects which unsuccessfully submitted bids in 2021 (light blue) within a 35 km of the site’s outer corners (red). Also indicated are existing substations and Eskom transmission lines.

Three operational WEFs – Roggeveld, Karusa and Soetwater – are located within a 35 km radius of the site. Two projects which reached financial closure in 2021 – Brand Valley and Rietkloof - are also located within 35 km of the site, while four more projects – Gunsfontein, Great Karoo, Esizayo and Karreebosch – unsuccessfully submitted bids in 2021 (Table 3.20). These 9 projects effectively account for all the active projects in greatest proximity to the site. Roggeveld, Karusa and Soetwater link into Eskom Komsberg. Brand Valley and Rietkloof would link into Komsberg via the collector substation constructed as part of the Roggeveld WEF.

Table 3.20: Overview of proximate REFs

	PROJECT	TYPE	MW	FEED	STATUS	COMMENT
1	Gunsfontein	WEF	200	Komsberg	Submitted Bid 5	36 turbines (150 m hub)
2	Soetwater	WEF	140	Komsberg	Operational	43 turbines (91.5 m hub) Adjacent to Karusa WEF
3	Great Karoo	WEF	???	Komsberg	Submitted Bid 5	42 turbines (150 m hub)
4	Karusa	WEF	140	Komsberg	Operational	52 turbines (91.5 m hub) Adjacent to Soetwater WEF
5	Esizayo	WEF	250	Komsberg	Submitted Bid 5	36 turbines approved
6	Rietkloof	WEF	140	Komsberg	Preferred Bid 5	Overlaps with Brandvalley & Roggeveld
7	Roggeveld	WEF	147	Komsberg	Operational	47 turbines (120 m hub)
8	Brandvalley	WEF	140	Komsberg	Preferred Bid 5	Overlaps with Rietkloof & Roggeveld
9	Karreebosch	WEF	140	Komsberg	Submitted Bid 5	Overlaps with Roggeveld WEF

As indicated in Figure 3.12 the areas to the west, north and south-west of the site either accommodate existing and or proposed WEFs. This is linked to the site's location within the Komsberg REDZ and proximity to the Komsberg substation. It is also reasonable to assume that the properties adjacent to the balance of the site may also become subject to further proposals.

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

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

- Review of project related information.
- Review of key policy and planning documents.
- Site visit to the study area and feedback from 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

At a national level, the development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to renewable energy. Renewable energy is also supported at a provincial and local municipal level. The proposed site is also located within the Komsberg REDZ, which was formally gazetted in 2018¹⁸. The area has therefore been identified as suitable for the establishment of renewable energy facilities and associated infrastructure.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

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

Potential negative impacts

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

¹⁸ GN114 of 2018

- Increased risk of veld fires.

4.3.1 Creation of local employment, skills development and business opportunities

The construction phase of 200 MW WEF will extend over a period of approximately 18 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. The closest towns to the site are Matjiesfontein (25 km to the south), Laingsburg (~ 33 km to the east) and Touws River (~ 61 km to the north).

Members from the local communities in these towns may benefit from the low skilled and semi-skilled employment opportunities. Most of these employment opportunities are also likely to accrue to Historically Disadvantaged (HD) members from these local communities. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. However, based on the experience from existing REFs that have been established on the Komsberg REDZ, the employment opportunities for members from the local community have been limited. This has in part been due to the low education and skills levels in the area.

Therefore, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment are likely to be limited. Where feasible the implementation of a training and skills development programme prior to the commencement of construction would also increase the potential to employ local community members. The number of low skilled and semi-skilled positions taken up by members from the local community will depend on the effective implementation of these enhancement measures by the proponent in consultation with the LM. However, due to the small size of the local towns in the area the ability to find suitably qualified and educated local workers may however be limited.

Based on information from similar projects the total wage bill will be in the region of R 31 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area. The capital expenditure associated with the construction phase will be approximately R 2 billion (2022 Rand value). Due to the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the LM. Implementing the enhancement measures listed below can create potential opportunities for potentially qualified local companies.

The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

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

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

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	With Enhancement
Extent	Local (2)	Local (3)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	Probable (3)	Highly probable (4)
Significance	Low (21)	Moderate (32)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Opportunity to up-grade and improve skills levels in the 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

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- 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 contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
- Before the construction phase commences the proponent should meet with representatives from the LM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that 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 LM 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 unplanned pregnancies.
- An increase in prostitution.
- An increase in communicable diseases, including COVID-19, tuberculosis (TB) and sexually transmitted diseases (STDs), including HIV.

The proponent has indicated that the objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. However, based on experience from current projects located in the Komsberg REDZ most of the employment opportunities have been taken up by contractors from outside of the area. Experience from current projects has indicated that the presence of construction workers has impacted on local communities in the area. These impacts include increase in STD rates and unplanned pregnancies. While it is possible to reduce the risks associated with construction workers it is not possible to totally avoid the potential impacts.

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	Medium (3)	Low (2)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (30)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely 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 residual/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 enhancement measures

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report and resolve incidents.
- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase that represents local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP.
- The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. 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 CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.
- The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.

- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor 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 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.4.2. The findings of the SIA indicate that the potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. This is due to the relatively isolated location of the study area and the limited economic and employment opportunities in the nearby towns of Laingsburg and Sutherland. The risks associated with the influx of job seekers are therefore likely to be low.

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

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely 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

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

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MC should also include the other proponents of solar energy projects in the area.
- The proponent should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities.
- The proponent should implement a policy that no employment will be available at the gate.

4.3.4 Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers 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.

The majority of farmers in the area have been exposed to the construction of the Roggeveld, Karusa and Soetwater WEFs, and therefore have first-hand experience of the impacts associated with the construction of WEFs and the associated infrastructure, including grid connections. The key issues raised included:

- 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 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.
- 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.

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, as indicated by the comments from local farmers in the area, it would appear that these measures have not been effectively implemented during the construction of Roggeveld, Karusa and Soetwater WEFs. The mitigation measures to address these risks are outlined below.

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

Nature: Potential risk to safety of 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 (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Highly Probable (4)	Low Probability (2)
Significance	Moderate (40)	Low (16)
Status	Negative	Negative
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

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- 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.
- All farm gates must be closed after passing through.
- Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
- The proponent should establish a MC and CoC for workers (see above).
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below).

- The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc.
- 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 in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation.
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.5 Nuisance 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 phase are likely to be limited. The traffic related impacts associated with the transport of materials to the site can also be effectively managed if the required mitigation are implemented. However, the construction of renewable energy facilities and the associated grid infrastructure has resulted in increased traffic and damage to local roads in the area. In addition to construction vehicles, the transport of workers to site and speed at which taxis travelled has been identified as concern.

Table 4.5: Assessment of the impacts associated with construction related activities

Nature: Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (1)	Reversible (1)
Probability	Probable (3)	Low Probability (2)
Significance	Low (21)	Low (12)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: If damage to local roads is not repaired then this will affect the other road users and result in higher maintenance costs. 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:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC 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 construction period. This should be outlined in the SEP.
- The proponent should implement 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 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.

4.3.6 Risk of veld fires

The presence on 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 summer months of December through to March. The local landowners indicated that although the risk of veld fires was low, they do pose a threat to farming operations.

Table 4.6: Risk posed by veld fires to livestock, farm infrastructure and grazing

Nature: Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Probable (3)	Low Probability (2)
Significance	Moderate (30)	Low (16)
Status	Negative	Negative
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:

- Preparation and implmenatation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implmenatation of a Commuinity Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- 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 summer 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

- The establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits to the affected landowners.
- Benefits associated with the socio-economic contributions to community development.

Potential negative impacts

- Visual impacts and associated impacts on sense of place.
- Impact on property values.
- Impact on tourism.

4.4.1 Improve energy security and develop the renewable energy sector

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed WEF also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP.

Improved energy security

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 was spent by businesses on backup generators¹⁹. A survey of 3 984 small business owners found that 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 during due to load shedding period²⁰.

Impact of a coal powered economy

The Green Jobs study (2011) notes that South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. The study notes that renewable energy provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa renewable energy is not as dependent on water compared to the massive water requirements of conventional power stations, has a limited footprint, and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

¹⁹ 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

²⁰ "How does load shedding affect small business in SA?". The Yoco Small Business Pulse (3: Q1 2019): 3

The Greenpeace Report (powering the future: Renewable Energy Roll-out in South Africa, 2013), also notes that within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. These include acid mine drainage from abandoned mines in South Africa and the risk this poses on the country's limited water resources.

Benefits associated with REIPPPP

The overview of the IPPPP (June 2020) indicates that the REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and IS2). This is almost double the inward FDI attracted into South Africa during 2015 (R22.6 billion). In terms of local equity shareholding, 52% (R31.5 billion) of the total equity shareholding (R61 billion) was held by South African's across BW1 to BW4, 1S2 and IS2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R 29.5 billion and contributes 49% to total equity. As far as Broad Based Black Economic Empowerment is concerned, Black South Africans own, on average, 33% of projects that have reached financial close, which is slightly above the 30% target.

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The shareholding by black people in operating companies of IPPs has averaged 24% (against the targeted 20%) for the 68 projects in operation (i.e. in BW1–4). The target for shareholding by black people in top management has been set at 40%, with an average 67% achieved to date. The target has therefore been significantly exceeded.

The total projected procurement spend for during the construction phase was R73.1 billion, while the proposed operations procurement spend over 20 years operational life is estimated at 76.8 billion. The combined (construction and operations) procurement value is projected as R149.9 billion, of which R81 billion has been spent to date. For construction, of the R70.2 billion already spent to date, R57.7 billion is from the 68 projects which have already been completed. These 68 projects had planned to spend R52.9 billion. The actual procurement construction costs have therefore exceeded the planned costs by 9% for completed projects. Of the R70.2 billion spent on procurement during construction, R59 billion has reportedly been procured from BBBEE suppliers, achieving 87% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion. The R59 billion spent on BBBEE during construction is 15% more than the R 51.1 billion that had originally been anticipated by all IPPs.

Total procurement spend by IPPs from Qualifying Small Enterprises (QSE) and Exempted Micro Enterprises (EME) has amounted to R24.7 billion (construction and operations) to date, which exceeds commitments by 96% and is 30% of total procurement spend to date (while the required target is 10%). QSE and EME's procurement spend for construction was R 22 billion, which is 4.4 times the targeted spend for construction of R4.9 billion during this procurement phase.

In terms of procurement from women-owned vendors to date, 5% of total construction procurement spend has been from woman-owned vendors (against a targeted 5%), and 6% of operational procurement spend has been realised from woman-owned vendors to date, thereby exceeding the targeted 5%. In terms of construction spend, R 3.2 billion was undertaken by women-owned vendors, which is almost double the R 1.9 billion estimated for the construction of projects that have reached financial close.

The REIPPPP has therefore created significant employment opportunities for black South African citizens and local communities beyond planned targets. This highlights the importance of the programme in terms of employment equity and the creation of more equal societies.

In terms of employment, to date, a total of 52 603 job years²¹ have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. 81%, 43% and 49% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

These job years should rise further past the planned target as more projects enter the construction phase. The REIPPPP has also ensured that black people in local communities have ownership in the IPP projects that operate in or nearby their vicinities. The establishment of renewable energy facilities therefore not only address environmental issues associated with climate change and consumption of scarce water resources, but also create significant socio-economic opportunities and benefits, specifically for historically disadvantaged, rural communities.

Table 4.7: Improve energy security and support renewable sector

Nature: Development of infrastructure to improve energy security and support renewable sector		
	Without Mitigation	With Mitigation
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (4)	High (4)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (48)	High (60)
Status	Negative	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Overall reduction in CO ₂ emission, reduction in water consumption for energy generation, contribution to the development of the renewable energy sector in South Africa and benefit for economic development and investment.		

Assessment of No-Go option

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

²¹ The equivalent of a full-time employment opportunity for one person for one year

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 proposed development will create in the region of 20 full time employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. Based on similar projects the annual operating budget will be in the region of R 24 million (2022 Rand values), including wages.

Table 4.8: Impact assessment of employment, skills development and business creation opportunities

Nature: Creation of employment, skills development and business opportunities associated with the operational phase		
	Without Mitigation	With Enhancement
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Highly Probable (4)
Significance	Low (14)	Moderate (36)
Status	Positive	Positive
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 powerline 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 proposed

WEF. 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 4.9: 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 Mitigation	With Enhancement
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Probability (3)	Definite (5)
Significance	Low (21)	Moderate (45)
Status	Positive	Positive
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 Benefits associated with the socio-economic development contributions

The REIPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed WEF can be used to support a number of social and economic initiatives in the area, including:

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

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2.2%, which is 125% higher than the minimum threshold level. To date (across seven bid windows) a total contribution of R23.1 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.2 billion. Of the total commitment, R18.8 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

As a percentage of revenue, SED obligations become effective only when operations commence, and revenue is generated. Of the 91 IPPs that have reached financial close (BW1–BW41), 68 are operational. The SED contributions associated with these 68 projects has amounted to R 1.2 billion to date.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. SED spend on education has been almost double the expenditure on enterprise development. In this regard IPPs have supported 1 123 education institutions with a total of R312 million in contributions, from 2015 to the end of June 2020. A total of 1 142 bursaries, amounting to R183.8 million, have been awarded by 55 IPPs from 2015 until the end of June 2020. The largest portion of the bursaries were awarded to African and Coloured students (97%), with women and girls receiving 56% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 61%, followed by the Eastern Cape (18%) and Western Cape (14%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

The Green Jobs study (2011) found that the case for renewable energy is enhanced by the positive effect on rural or regional development. Renewable energy facilities located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

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

Table 4.10: Assessment of benefits associated with socio-economic development contributions

Nature: Benefits associated with support for local community's form SED contributions		
	Without Mitigation	With Enhancement²²
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	High (4)
Reversibility	N/A	N/A
Probability	Hihgly Probability (4)	Definite (5)
Significance	Moderate (36)	Moderate (55)
Status	Positive	Positive
Reversibility	N/A	
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Promotion of social and economic development and improvement in the overall well-being of the community		

Assessment of No-Go option

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

Recommended enhancement measures

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

- The proponents should liaise with the LM and KHLM to identify projects that can be supported by SED contributions.
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.
- Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.

4.4.5 Visual impact and impact on sense of place

The proposed WEF will impact on the areas existing rural sense of place. However, the impact on the areas sense of place should be viewed within the context of the site's location within the Komsberg REDZ, existing and proposed renewable energy projects and Eskom powerlines.

The proposed site is located within the Komsberg REDZ and Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of large scale renewable energy facilities and associated grid infrastructure. In this regard three operational

²² Enhancement assumes effective management of the community trust

WEFs (Perdekraal East, Roggeveld and Karusa WEF) are located within 35km of the proposed site. The area is also affected by the existing Eskom transmission lines. The visual character of the area has therefore been substantially altered by existing WEFs and transmission lines in the area. The Brandvalley and Rietkloof WEFs have also been awarded preferred bidder status in 2021 and construction is expected to commence in 2022. In addition, none of the directly affected and or adjacent landowners interviewed raised concerns about potential visual impacts associated with the proposed expansion project.

Table 4.11: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	High Probability (4)	High Probability (4)
Significance	Moderate (44)	Moderate (44)
Status	Positive	Positive
Can impact be mitigated?	Yes	
Enhancement: 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 also be implemented.
- Install radar activated civil aviation light system.

4.4.6 Potential impact on property values

As indicated in Section 2.5, a literature review was undertaken as part of the SIA. It should be noted that the review does not constitute a property evaluation study and merely seeks to comment on the potential impact of wind farms on property values based on the findings of studies undertaken overseas. The assessment rating is based on the findings of the review.

In total five articles were identified and reviewed namely:

- Stephen Gibbons (April 2014): Gone with the wind: Valuing the Visual Impacts of Wind turbines through house prices. London School of Economics and Political Sciences & Spatial Economics Research Centre, SERC Discussion Paper 159.
- Review of the Impact of Wind Farms on Property Values, Urbis Pty Ltd (2016): Commissioned by the Office of Environment and Heritage, NSW, Australia.

- Yasin Sunak and Reinhard Madlener (May 2012): The Impact of Wind Farms on Property Values: A Geographically Weighted Hedonic Pricing. School of Business and Economics / E.ON Energy Research Center, RWTH Aachen University. Model Working Paper No. 3/2012.
- Martin D. Heintzelman and Carrie M. Tuttle (March 3, 2011): Values in the Wind: A Hedonic Analysis of Wind Power Facilities. Economics and Financial Studies School of Business, Clarkson University.
- Ben Hoen, Jason P. Brown, Thomas Jackson, Ryan Wiser, Mark Thayer and Peter Cappers (August 2013): A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Ernest Orlando Lawrence Berkeley National Laboratory.

The literature reviewed was based on an attempt by the authors of the SIA to identify what appear to be “academically and or scientifically” based studies that have been undertaken by reputable institutions post 2010. However, the literature review does not represent an exhaustive review. The key findings of the literature review are summarised below.

Stephen Gibbons (April 2014)

The overall findings of the study indicate that wind farms reduce house prices in postcodes where the turbines are visible and reduce prices relative to postcodes close to wind farms where the wind farms are not visible. The overall finding is that “averaging over wind farms of all sizes, this price reduction is around 5-6% within 2km, falling to less than 2% between 2 and 4km, and less than 1% by 14km which is at the limit of likely visibility”. The study notes that small wind farms have no impact beyond 4km, whereas the largest wind farms (20+ turbines) reduce prices by 12% within 2km and reduce prices by small amounts right out to 14km (by around 1.5%).

Martin D. Heintzelman and Carrie M. Tuttle (March 2011)

The findings of the study indicate that nearby wind facilities significantly reduce property values. In this regard, based on the repeat sales model, the construction of turbines within 0.5 miles (0.8 km) of the property resulted in a 10.87%-17.77% decline in sales price depending on the initial distance to the nearest turbine and the particular specification. At a distance of 1 mile (1.6km) (about 20% of the sample), the decline in value was between 7.73% and 14.87%. The study notes that from a policy perspective, these results indicate that there is a need to compensate local homeowners/communities for allowing wind development within their borders.

The paper concludes that the results of the study appear to indicate that proximity to wind turbines does have a negative and significant impact on property values. Importantly, the best and most consistent measure of these effects appears to be the simple, continuous, proximity measure, the (inverse distance) to the nearest turbine.

Ben Hoen, et al (August 2013)

The study was based on data from more than 50 000 home sales among 27 counties in nine states of the USA. The homes were located within 10 miles of 67 different wind facilities, and 1 198 sales were within 1 mile (1.6 km) (331 of which were within a half mile (0.8km)) of a turbine. The findings of the study indicated that across all model specifications, there was no statistical evidence that home prices near wind turbines were affected in either the post-construction or post-announcement/pre-construction periods. Therefore, if effects do exist, either the average impacts are relatively small (within the margin of error in the models) and/or sporadic (impacting only a small subset of homes). In addition, the sample size and analytical methods enabled the study to bracket the size of effects that would be detected, if those effects were present at all.

Based on the results, the study found that it is *highly unlikely* that the actual average effect for homes that sold in the sample areas within 1 mile of an existing turbine is larger than +/- 4.9%. In other words, the average value of these homes could be as much as 4.9% higher than it would have been without the presence of wind turbines, as much as 4.9% lower, the same (i.e., zero effect), or anywhere in between. Similarly, it is highly unlikely that the average actual effect for homes sold in the sample area within a half mile of an existing turbine is larger than +/-9.0%. In other words, the average value of these homes could be as much as 9% higher than it would have been without the presence of wind turbines, as much as 9% lower, the same (i.e., zero effect), or anywhere in between. The study notes that, regardless of these potential maximum effects, the core results of the study consistently show no sizable statistically significant impact of wind turbines on nearby property values.

Urbis Pty Ltd (2016)

Based on the outcome of the study the authors were of the opinion that wind farms may not significantly impact rural properties used for agricultural purposes. However, the study found that there is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas. In conclusion, the authors of the Urbis study found:

- Appropriately located wind farms within rural areas, removed from higher density residential areas, are unlikely to have a measurable negative impact on surrounding land values.
- There is limited available sales data to make a conclusive finding relating to value impacts on residential or lifestyle properties located close to wind farm turbines, noting that wind farms in NSW have been constructed in predominantly rural areas.

Based on the findings of the literature review the potential impact of WEFs on rural property values is likely to be low, specifically for farms that are farmed as productive farms.

The findings of the SIA indicate that traditional farmers, specifically those on whose property renewable energy projects are located, support the development of renewable energy. The projects create an opportunity to generate additional income which can be used to support their farming operations. The establishment of renewable energy facilities therefore enhances their property values. However, landowners who have acquired properties as lifestyle farms are less supportive of the development of large-scale renewable energy facilities, specifically wind farms, due to the impact on the areas sense of place. The impact on sense of place also includes night time impacts associated with aviation lights. The development of WEFs therefore has the potential to impact negatively on the property values of lifestyle properties.

The potential impact in property values is therefore likely to differ depending on the nature of the land use. In the case of land used for traditional farming the impact is likely to be negligible. The value of farm land in the area will be linked to rainfall, veld quality and carrying capacity, availability of water and access etc. For lifestyle properties the potential impact will depend on proximity and visibility of the wind turbines and associated infrastructure. However, the potential impact would also need to be viewed within the context of the location of the affected properties within the Komsberg REDZ and the private cost vs the broader social benefit of renewable energy. In this regard the broader social benefits associated with renewable energy are likely to outweigh the potential negative impacts on property values of privately owned properties. Based on the findings of international research the potential impact on property values is also likely to be limited.

Table 4.12: Assessment of potential impact on property values and operations

Nature: Visual impact associated with the proposed facility and associated potential impact on property values.		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	N/A	N/A
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (24)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place and property values		

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.
- Install radar activated civil aviation light system.

4.4.7 Potential impact on tourism

A review of international literature in the impact of wind farms was undertaken as part of the SIA (Section 2.6). The key findings are summarised below. Three articles were reviewed, namely:

- Atchison, (April 2012). Tourism Impact of Wind Farms: Submitted to Renewables Inquiry Scottish Government. University of Edinburgh.
- Glasgow Caledonian University (2008). The economic impacts of wind farms on Scottish tourism. A report prepared for the Scottish Government.
- Regeneris Consulting (2014). Study into the Potential Economic Impact of Wind Farms and Associated Grid Infrastructure on the Welsh Tourism Sector.

The research by Aitchison (2012) found that that previous research from other areas of the UK has demonstrated that wind farms are very unlikely to have any adverse impact on tourist numbers (volume), tourist expenditure (value) or tourism experience (satisfaction) (Glasgow Caledonian University, 2008; University of the West of England, 2004). In addition, to date, there is no evidence to demonstrate that any wind farm development in the UK or overseas has resulted in any adverse impact on tourism. In conclusion, the findings from both primary and secondary research relating to the actual and potential tourism impact of wind farms indicate that there will be neither an overall decline in the number of tourists visiting an area nor any overall financial loss in tourism-related earnings as a result of a wind farm development.

In addition, all of the studies that have sought to predict impact have demonstrated that any negative impact of wind farms on tourism will be more than outweighed by the increase in tourists that are attracted by wind farms, by the increase in employment brought about by the development of wind farms and/or by the continuing growth of tourism. The study by the Glasgow Caledonian University (2008) found that only a negligible fraction of tourists will change their decision whether to return to Scotland as a whole because they have seen a wind farm during their visit. The study also found that 51.0% of respondents indicated that they thought wind farms could be tourist attractions. In this regard the visitor centre at the Whitelee Wind Farm in east Ayrshire Scotland run by ScottishPower Renewables has become one of the most popular 'eco-attractions' in Scotland, receiving 200 000 visitors since it opened in 2009.

The study by Regeneris Consulting (2014) found that there was no evidence that wind farms would deter tourists from traveling along designated visitor or tourists' routes. The study indicated that small minorities of visitors would be encouraged, whilst others would be discouraged. Overall, however, there was no evidence to suggest that there would be any significant change in visitor numbers using these routes to reach destination elsewhere.

Based on the findings of the SIA there the only significant local tourist facility in the area is self catering accommodation located on Standvastigheid 210/RE (Saaiplaas) owned by Mr Francois Conradie. Mr Conradie indicated that the guest accommodation facility has been fully booked out to contractors since the start of WEF construction activities in the area, and is still fully booked for the foreseeable future. The establishment of REFs in the area has therefore benefitted to the local tourism industry, specifically given the impact associated with Covid-19 pandemic. In addition, based on the findings of the literature review and the SIA there is limited evidence to suggest that the proposed WEF would have a significant impact on the tourism in the LM at a local and regional level. The findings of the literature review also indicate that wind farms do not impact on tourist routes.

Table 4.13: Impact on tourism in the region

Nature: Potential impact of the WEF on local tourism operations and activities		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Very Low (1)	Very Low (1)
Reversibility	N/A	N/A
Probability	Probable (3)	Probable (3)
Significance	Low (21)	Low (21)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place and future tourism opportunities in the area.		

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.
- Install radar activated civil aviation light system.

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. In this regard the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues are also likely to be relevant to solar facilities and associated infrastructure, including the proposed WEF. The relevant issues identified by Scottish Natural Heritage study include:

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

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

A number of operational WEFs (Perdekraal East, Roggeveld and Karusa WEF) are located in the study area. The site and general area are also traversed by existing Eskom 400 kV and 765 kV transmission lines. Added to this the Brandvalley and Rietkloof WEFs were awarded preferred bidder status in 2021 and construction is expected to commence in 2022. The potential for cumulative impacts is therefore high.

However, the cumulative impact on the areas sense of place should be viewed within the context of the site's location within the Komsberg REDZ and Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of large scale renewable energy facilities and associated grid infrastructure. The visual character of the area has also already been substantially altered by existing WEFs and transmission lines in the area. Cumulative visual impacts on the areas sense of place cannot therefore be avoided.

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

Nature: Visual impacts associated with the establishment of more than one REF 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 (2)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	High Probability (4)	High Probability (4)
Significance	Moderate (52)	Moderate (56)
Status (positive/negative)	Negative	Negative
Can impacts be mitigated?	Limited potential	
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.
- Install radar activated civil aviation light system.

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The objective will be to source as many low and semi-skilled workers for the construction phase from the LM. This will reduce the pressure on local services and accommodation and the nearby towns of Laingsburg, Matjiesfontein and Sutherland. However, as indicated above, based on experience the number of local members of the community employed during the construction phase for the existing projects in the area has been limited.

For a single WEF / SEF project ~70 skilled workers and 400 low to semi-skilled workers require accommodation. In the event of the construction phase for 2-3 projects overlapping, the total number of workers requiring accommodation would be between 1 200 and 1 500. A review of potential accommodation options indicates that there are in the region of 900-1 000 opportunities available in Laingsburg, Matjiesfontein, Sutherland Touws River.

However, many of the accommodation facilities are relatively small, do not provide meals, or services such as laundry etc. The logistics associated with managing ~ 400 workers associated with a single project (transport to and from site, meals, laundry, off-site medical complaints, etc.) accommodated in a range of facilities scattered around the towns of Laingsburg, Touws River and Sutherland are therefore likely to be create a number of logistics related challenges. In addition, many of the smaller accommodation facilities cater for tourists (Sutherland) and travellers (Laingsburg, Touws River) and as such may be reluctant to provide accommodation for semi and low skilled workers over an extended period of 10 or more months. There is therefore insufficient accommodation available in Laingsburg, Matjiesfontein, Sutherland and Touws River to accommodate construction workers associated with 2 or more projects. The

cumulative impacts on accommodation and local services (health care, clinics etc.) will therefore be significant.

There is therefore a need to provide new accommodation and up-grade local services. Based on the discussions with the Laingsburg, Breede Valley and Karoo Hoogland Municipality, both Municipalities are in favour of accommodating workers in town as opposed to outside of town, as is the case with the construction camp established on a farm for the Karusa WEF.

In this regard the Laingsburg, Breede Valley and Karoo Hoogland Municipality indicated that the benefits to the local economy outweighed the potential negative impacts associated with accommodating construction workers in the towns. Two options were identified in the discussions with the Laingsburg, Breede Valley and Karoo Hoogland Municipality, namely:

- Use existing underutilised facilities / buildings in Laingsburg, Touws River and Sutherland.
- Establishment of new facility/s to accommodate construction workers. In this regard the Laingsburg, Breede Valley, and Karoo Hoogland Municipality indicated that they would work with contractors to identify potentially suitable sites (with a focus on municipal owned land) and expedite the planning approval process.

In terms of upgrading and expanding local services, such as clinics, hospitals etc. Discussions should be held with the Provincial Department of Health. The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the LM. These benefits will create opportunities for investment in the LM, including the opportunity to up-grade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. The proposed WEF is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED. This will provide revenue that can be used by the LM to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial, and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the Laingsburg LM and KHLM.

Table 4.15: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF in the LM and KHLM has the potential to place pressure on local services, specifically medical, education and accommodation.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (2)	Local and regional (3)
Duration	Short term (2)	Medium term (3)
Magnitude	Low (4)	Moderate (6)
Reversibility	N/A	N/A
Probability	Probable (3)	High Probability (4)
Significance	Low (24)	Medium (48)
Status (positive/negative)	Negative	Negative
Can impacts be mitigated?	Yes	
Mitigation: See below		

Assessment on No-Go option

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

Recommended mitigation measures

The proponent should liaise with the LM, KHM and Provincial Departments to address accommodation issues and impacts on local services.

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the LM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities. The review of the REIPPPP (June 2020) indicates that the SED contributions associated with 68 operational projects has amounted to R 1.2 billion to date. In terms of Enterprise Development (ED), R 7.2 billion has been committed for BW1 to BW4, 1S2 and 2S2. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R360 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. Up until the end of June 2020 a total of R 384.2 million had already been made to the local communities located in the vicinity of the 68 operating IPPs. This represents 93% of the total R384.2 million enterprise development contributions made to date).The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Table 4.16: Cumulative impacts on local economy

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF in the LM and other local municipalities located within the Komsberg REDZ will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local and regional (2)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Very High (5)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (40)	High (60)
Status (positive/negative)	Positive	Positive
Can impacts be enhanced?	Yes	
Enhancement: See below		

Assessment of No-Go option

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

Recommended mitigation measures

The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed WEF, within the LM and other local municipalities located within the Komsberg REDZ should be supported.

4.8 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the Project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The project also aims to reduce the carbon footprint associated with energy generation. As indicated above, energy supply constraints and the 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 carbon emissions. The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, 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 significant negative social cost.

Table 4.17: Assessment of no-development option

Nature: 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 Mitigation ²³	With Enhancement ²⁴
Extent	Local-International (5)	Local-International (5)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	High Probability (4)	High Probability (4)
Significance	Moderate (48)	Moderate (48)
Status	Negative	Positive
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 WEF should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.

²³ Assumes project is not developed

²⁴ 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.
- A review of social and economic issues associated with similar developments.
- Site visit and interviews with key stakeholders.
- The experience of the authors with other renewable energy projects.

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

At a national level, the development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to renewable energy. Renewable energy is also supported at a provincial and local municipal level. The proposed site is also located within the Komsberg REDZ, which was formally gazetted in 2018²⁵. The area has therefore been identified as suitable for the establishment of renewable energy facilities and associated infrastructure.

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 18 months and create in the region of 350 employment opportunities. Based on information provided by the proponent, approximately 75% of the jobs will benefit low-skilled workers, 25% semi-skilled and 5% high skilled. Members from the local communities in Laingsburg, Matjiesfontein and Sutherland may potentially qualify for low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of

²⁵ GN114 of 2018

the community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit.

However, based on the experience from existing REFs that have been established on the Komsberg REDZ, the employment opportunities for members from the local community have been limited. This has in part been due to the low education and skills levels in the area. Therefore, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment are likely to be limited.

The total wage bill will be in the region of R 31 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area and the LM. The capital expenditure associated with the construction phase will be approximately R 2 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due the lack of diversification in the local economy the potential for local companies is likely to be limited. The majority of benefits are therefore likely to accrue to contractors and engineering companies based outside the LM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

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

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

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)

Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

5.2.3 Operational phase impacts

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

Potential positive impacts

- Establishment of infrastructure to improve energy security and support renewable sector.
- Creation of employment opportunities.
- Benefits for local landowners.
- Benefits associated with socio-economic contributions to community development.

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts

- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 5.2.

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	Medium (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)

Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Impact on property values	Low (Negative)	Low (Negative)
Impact on tourism	Low (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place

Three operational WEFs (Perdekraal East, Roggeveld and Karusa WEF) are located within 35km of the proposed site. The area is also traversed by existing Eskom transmission lines. Added to this the Brandvalley and Rietkloof WEFs were awarded preferred bidder status in 2021 and construction is expected to commence in 2022. The potential for cumulative impacts is therefore high.

However, the cumulative impact on the areas sense of place should be viewed within the context of the site's location within the Komsberg REDZ and Central Transmission Corridor. The area has therefore been identified as suitable for the establishment of large scale renewable energy facilities and associated grid infrastructure. The visual character of the area has also already been substantially altered by existing WEFs and transmission lines in the area. Cumulative visual impacts on the areas sense of place cannot therefore be avoided.

Cumulative impact on local services and accommodation

The findings of the SIA indicate that there is insufficient accommodation available in Laingsburg, Matjiesfontein and Sutherland to accommodate construction workers associated with 2 or more projects. The cumulative impacts on accommodation and local services (health care, clinics etc.) will therefore be significant. There is therefore a need to provide new accommodation and up-grade local services. With effective planning the significance of this impact with mitigation was rated as **Low Negative**.

Cumulative impact on local economy

The significance of this impact with enhancement was rated as **High Positive**.

5.2.5 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, 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 significant negative social cost. The No-Development option is not supported by the findings of the SIA.

5.3 CONCLUSIONS

The findings of the SIA indicate that the proposed Ezisayo WEF expansion project will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The project will also contribute to local economic development through socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The

potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented.

The Ezisayo WEF expansion project is also located within the Komsberg REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities. The establishment of the proposed Ezisayo WEF expansion project is therefore supported by the findings of the SIA.

ANNEXURE A

INTERVIEWS

- Conradie, Mr Francois (telephonic 2022-03-18). Owner Standvastigheid 210/RE.
- Freysen, Mr Kallie (telephonic 2022-03-17). Owner Aanstoot 72/2.
- Hanekom, Mr Gido (telephonic 2022-03-17). Owner Aurora 285.
- Le Roux, Mr Jacques (telephonic 2022-03-17). Owner Leeuwfontein 71/RE, 71/1,
- Van der Vyfer, Mr Izak (telephonic 2022-03-28). Owner Klipgat 70.
- Van Dyk, Mr Japie (telephonic 2022-03-17). Owner Aanstoot 72/1; Annexe Josephskraal 84.

REFERENCES

- National Development Plan (2011).
- National Energy Act (Act No 34 of 2008).
- White Paper on Energy Policy (1998).
- White Paper on Renewable Energy (2003).
- Integrated Energy Plan (2019).
- Integrated Resource Plan (2018).
- New Growth Path Framework (2010).
- National Infrastructure Plan (2012).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Western Cape Provincial Spatial Development Framework (2014).
- Western Cape Infrastructure Framework (2013).
- Western Cape Provincial Strategic Plan (2014).
- Western Cape Green Economy Strategy (2013).
- One Cape 2040 (2012)
- Laingsburg Integrated Development Plan (IDP) (2017-2022).
- Laingsburg Local Economic Development Strategy (2019-2029).

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Assessment of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct²⁶, indirect²⁷, secondary²⁸ as well as cumulative²⁹ impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria³⁰ presented in **Table 0-1**.

Table 0-1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite

²⁶ Impacts that arise directly from activities that form an integral part of the Project.

²⁷ Impacts that arise indirectly from activities not explicitly forming part of the Project.

²⁸ Secondary or induced impacts caused by a change in the Project environment.

²⁹ Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

³⁰ The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30		31 to 60		61 – 100
Environmental Significance Rating (Negative (-))	Low (-)		Moderate (-)		High (-)
Environmental Significance Rating (Positive (+))	Low (+)		Moderate (+)		High (+)

ANNEXURE C

10 Firs Avenue, Claremont, 7708, South Africa
(Cell) 082 600 8266
(E-Mail) tony@tonybarbour.co.za

Tony Barbour's has 28 years' experience as an environmental consultant, including 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, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Senegal, 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):

5 April 2022

Date: