

SOCIAL IMPACT ASSESSMENT

SOL INVICTUS PV SOLAR GRID CONNECTION

NORTHERN CAPE PROVINCE

SEPTEMBER 2021

Prepared for

WSP

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

WSP was appointed to manage the Basic Assessment (BA) process for the grid connection for the proposed Sol Invictus PV Solar Energy Facility (PV1-6). The Sol Invictus PV Solar Energy Facility is located within the Nama Khoi Municipality (NKM). The grid connection feeds into the Aggeneys substation, which is located near the mining town Aggeneys, which is located ~ 23 km east of the Sol Invictus PV Solar Energy Facility within the Khai-Ma Municipality (KMM). The NKM and KMM are located within the Namakwa District Municipality (NDM). The study area is located within the Springbok Renewable Energy Development Zone (REDZ) in the Northern Cape Province.

Tony Barbour was appointed by WSP to prepare Social Impact Assessment (SIA) as part of the BA process.

SUMMARY OF KEY FINDINGS

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

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative Impacts.
- No-Go Development option.

FIT WITH POLICY AND PLANNING

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

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 3-6 months and create in the region of 30-40 employment opportunities. The total wage bill will be in the region of R 1.5 million (2021 Rand values). Most of the low and semi-skilled employment opportunities are likely to benefit residents from local towns in the area, including Aggeneys, Poffadder and Keimoes. Most the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a short term positive social benefit in an area with limited employment opportunities. A

percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in MM.

The capital expenditure associated with the construction of power line will be ~25 million (2021 Rand values) and will create opportunities for the local and regional and local economy. The sector of the local economy most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the development and short construction period the benefits will be limited.

Potential negative impacts

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

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the proposed construction of the power line can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

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

OPERATIONAL PHASE

The benefits associated with the Sol Invictus PV Solar Cluster are dependent upon being able to connect to the national grid. The key social issues associated with the operational phase include:

Potential positive impacts

- Improve energy security and establishment of energy infrastructure.
- Creation of employment opportunities.

Potential negative impacts

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

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the proposed power line can therefore be effectively mitigated if the recommended mitigation measures are implemented.

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

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation / Enhancement	Significance With Mitigation / Enhancement
Improve energy security and establishment of energy infrastructure	Medium (Negative) ¹	High (Positive) ²
Creation of employment and business opportunities during maintenance	Low (Positive)	Low (Positive)
Visual impact and impact on sense of place	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of maintenance workers	Medium (Negative)	Low (Negative)

CUMULATIVE IMPACT ON SENSE OF PLACE

There are a number of other powerlines located in the study area. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more power lines along a single journey, e.g., road or walking trail) does therefore exist. The VIA indicates that there are a large number of approved renewable energy generation applications within the Springbok REDZ, and this is expected to increase the cumulative visual impact both for the primary project components and for the ancillary components (i.e. grid connection infrastructure). However, the VIA notes that given that the area falls within the Western Transmission Corridor the cumulative visual impact is considered to be within acceptable limits.

NO-GO DEVELOPMENT OPTION

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

¹ Assumes powerline is not developed

² Assumes powerline is developed

CONCLUSIONS AND RECOMMENDATIONS

The energy security benefits associated with the proposed Sol Invictus PV Solar Cluster are dependent upon it being able to connect to the national grid via the establishment of the Sol Invictus grid connection infrastructure.

The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed overhead power line are **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The power line is also located within the Springbok REDZ and Northern Transmission Corridor. The establishment of proposed powerline 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;	See Section 1.5.2
(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	See Section 1.5.2
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	See Section 1.5.2
(q) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Comply with the Assessment Protocols that were published on 20 March 2020, in Government

	<p>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

BA	Basic Assessment
DBSA	Development Bank of Southern Africa
DM	District Municipality
DEA&DP	Department of Environmental Affairs and Development Planning
EIA	Environmental Impact Assessment
EME	Exempted Micro Enterprises
EMP	Environmental Management Programme
EPHC	Environment Protection and Heritage Council
FDI	Foreign Direct Investment
HD	Historically Disadvantaged
HDI	Human Development Index
I&APs	Interested and Affected Parties
IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolts
LCOE	Levelised Cost of Electricity
LED	Local Economic Development
LM	Local Municipality
MF	Monitoring Forum
MW	Megawatt
NCP	Northern Cape Province
NCPGDP	Northern Cape Provincial Growth and Development Plan
NDM	Namakwa District Municipality
NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
NKLM	Nama Khoi Local Municipality
OCGT	Open Cycle Gas Turbine
O&M	Operations and Maintenance
QSE	Qualifying Small Enterprises
PPA	Power Purchase Agreement
RE	Renewable Energy
REDZ	Renewable Energy Development Zone
REF	Renewable Energy Facility
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
SAWEA	South African Wind Energy Association
SDF	Spatial Development Framework
SDI	Sustainable Development Initiative
SEA	Strategic Environmental Assessment
SED	Socio-Economic Development
SIA	Social Impact Assessment
SMME	Small, Medium, Micro Enterprise
STD	Sexually Transmitted Disease
VIA	Visual Impact Assessment
WEF	Wind Energy Facility
WWF	World Wildlife Fund

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SECTION 1: INTRODUCTION

1.1 INTRODUCTION

WSP was appointed to manage the Basic Assessment (BA) process for the grid connection for the proposed Sol Invictus PV Solar Energy Facility (PV1-6). The Sol Invictus PV Solar Energy Facility is located within the Nama Khoi Municipality (NKM). The grid connection feeds into the Aggeneys substation, which is located near the mining town Aggeneys, which is located ~ 23 km east of the Sol Invictus PV Solar Energy Facility within the Khai-Ma Municipality (KMM). The NKM and KMM are located within the Namakwa District Municipality (NDM). The study area is located within the Springbok Renewable Energy Development Zone (REDZ) in the Northern Cape Province (Figure 1.1 and 1.2).

Tony Barbour was appointed by WSP to prepare Social Impact Assessment (SIA) as part of the BA process.



Source: VIA Logis, August 2021

Figure 1.1: Regional locality of the study area.

1.2 TERMS OF REFERENCE AND APPROACH TO STUDY

The approach to the SIA is based on the DEA&DP's Guidelines for Social Impact Assessment (DEA&DP, 2007). The key activities in preparing the Social Statement included:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Site visit to the area as part of Sol Invictus Community Needs Assessment.

- Review of the findings of the Visual Impact Assessment (VIA) prepared by Logis (August 2021).
- Identification of key potential social issues associated with the proposed project.
- Preparation of Social Statement.

The identification of potential social issues associated with the proposed grid connection is based on observations during the project site visit, review of relevant documentation, findings of the VIA and experience with similar projects and the general area. Annexure A contains a list of the secondary information reviewed. Annexure B summarises the assessment methodology used to assign significance ratings to the assessment process.

1.3 PROJECT DESCRIPTION

Sol Invictus (Pty) Ltd is proposing 22.7 km 132 kV overhead powerline to connect the authorised Sol Invictus 1-6 Solar Photovoltaic (PV) Facilities to the national grid. The proposed infrastructure is located approximately 5km south-west of the town of Aggeneys, within the NKM and KMM in the Northern Cape Province.

The project includes the following:

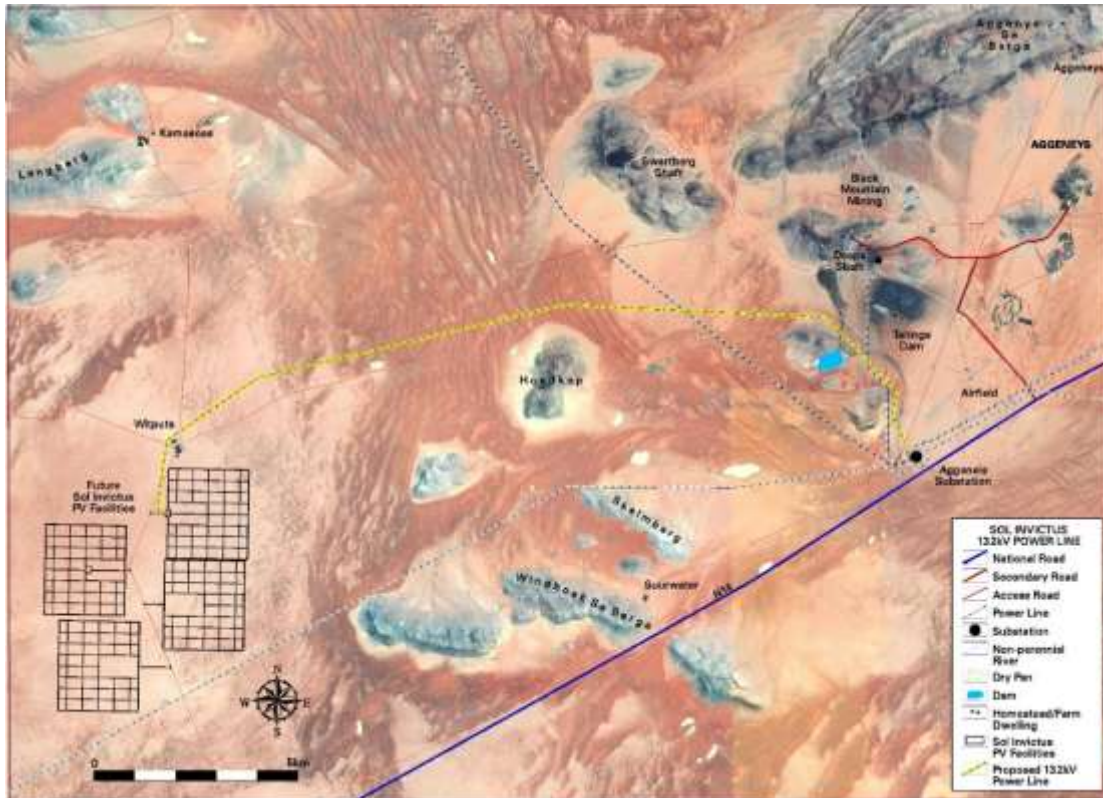
- A 400kV busbar³ extension, 400/132kV 500MVA transformer and 132kV busbars at the Eskom Aggenys Substation.
- One 22.7km 132kV overhead powerline (steel single or double structure with kingbird conductor) spanning between the six Sol Invictus PV facilities and the Aggenys Substation. Only one alternative is proposed for the Sol Invictus grid connection infrastructure (Figure 1.2).

The proposed powerline will traverse eight farm portions, starting at the Aggenys Substation, and traversing in a westerly direction towards the Sol Invictus Solar PV Facilities' collector substation. The following farm portions are of relevance:

- Portion 2 of the Farm Aggeneys 56 (Aggenys Substation).
- Portion 1 of the Farm Aggeneys 56.
- Portion 2 of the Farm Zuurwater 62.
- Portion 6 of the Farm Zuurwater 62.
- Portion 5 of the Farm Zuurwater 62.
- Portion 14 of the Farm Taaibosmond 66.
- Portion 6 of the Farm Taaibosmond 66.
- Portion 5 of the Farm Taaibosmond 66 (Sol Invictus Solar PV Facility).

The power line towers will either be steel lattice or monopole structures with a maximum height up to 36m above ground level. The servitude generally associated with 132kV power lines will be up to 40m wide and it is expected that the construction phase will be up to 24 months long.

³ In electric power distribution, a busbar (also bus bar) is a metallic strip or bar, typically housed inside switchgear, panel boards, and busway enclosures for local high current power distribution (Wikipedia).



Source: VIA Logis, August 2021
Figure 1.2: Location of proposed powerline alignment

1.4 OVERVIEW OF THE STUDY AREA

The study area has a rural and natural character within a semi-desert environment, with vast expanses of open space and desert vistas (VIA Logis, August 2021). The larger region is generally referred to as Namaqualand and more locally as Bushmanland, after the indigenous San people who inhabited the area. The majority of the study area is sparsely populated (less than 1 person per km²), with the highest concentration of people living in the town of Aggeneys (population 2040). The residents are largely associated with employees at the Black Mountain Mine.

The Visual Impact Assessment (Logis, 2021) notes that the study area consists of a landscape that can be described as remote due to its considerable distance from any major metropolitan centres or populated areas (Photograph 1.1). The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the availability of water. Settlements, where they occur, are usually rural homesteads and farmsteads.

Very few homesteads and settlements are present within the study area. These include Witputs (at the proposed Sol Invictus Solar PV facilities), Suurwater, Kamasoas and the original Aggeneys farmstead (Photograph 1.2). The VIA notes that there are no designated protected areas or any identified tourist attractions or destinations within the study area.⁴

⁴ Sources: DEAT (ENPAT Northern Cape), NBI (Vegetation Map of South Africa, Lesotho and Swaziland), NLC2018 (ARC/CSIR), REEA_OR_2021_Q1 and SAPAD2021 (DFFE).



Source: VIA Logis, August 2021

Photograph 1.1: Landscape in the study area



Source: VIA Logis, August 2021

Photograph 1.2: Witputs homestead

The N14 national road links Springbok in the west with Upington in the east. The N14 is located immediately to the south of the Aggeneys Substation (Photograph 1.3) and similarly provides access to the Sol Invictus Solar PV facilities via the Witputs dirt road from the N14.



Source: VIA Logis, August 2021

Photograph 1.3: Aggeneys Substation viewed from N14

Despite the rural and natural character of the study area, there are a large number of overhead powerlines in the study area, all congregating at the Aggeneys Substation. The areas rural sense of place has therefore been significantly altered. The powerlines include:

- Black Mountain/Black Mountain Mine 1 66kV.
- Black Mountain/Black Mountain Mine 2 66kV.
- Aggeneis/Gamsberg 1 66kV.
- Aggeneis/Black Mountain 1 66kV.
- Aggeneis/Black Mountain 2 66kV.
- Aggeneis>Nama 1 220kV.
- Aggeneis/Harib 1 220kV.
- Aggeneis/Harib 2 220kV.
- Aggeneis/Paulputs 1 220kV.
- Aries/Aggeneis 1 400kV.
- Aggeneis/Bypass 1 400kV.

The proposed Sol Invictus power line will cross four of these power lines north and north-west of the Aggeneis substation. The proposed powerline is also located

within the Springbok Renewable Energy Development Zone (REDZ) and Northern Strategic Transmission Corridor. REDZs are described as⁵:

"areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country."

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 Assumptions

Technical suitability

It is assumed that the development site represents a technically suitable site for the establishment of the proposed grid infrastructure. The site is also located in the Springbok REDZ and Northern Transmission Corridor.

Strategic importance of the project

The strategic importance of promoting renewable energy and associated grid infrastructure is supported by the national and provincial energy policies. 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 Socio-Economic Assessment 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 wind energy and the technical, spatial and land use constraints required for Renewable Energy Facilities (REFs). The site is also located in the Springbok REDZ and Northern Transmission Corridor.

1.5.2 Limitations

Demographic data

Some of the information contained in some key policy and land use planning documents, such as IDPs etc., is based on the 2011 Census. These limitations do not have a material bearing on the findings of the Socio-Economic Assessment. In addition, information from the 2016 Community Survey has been added where it is available.

Interviews

No interviews were undertaken as part of the SIA. However, given the sparsely populated character of the area and the presence of a number of existing powerlines, the social issues are likely to be limited.

⁵ Source: <https://redzs.csir.co.za>

1.6 SPECIALIST DETAILS

Tony Barbour, the author of this report, is an independent specialist with 28 years' experience in the field of environmental management. In terms of Social Impact Assessment experience Tony Barbour has undertaken in the region of 300 SIA's and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the DEA&DP in the Western Cape in 2007. Annexure A contains a copy of the Curriculum Vitae (CV) for Tony Barbour.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour, the specialist consultant responsible for undertaking the study and preparing the Social Impact Assessment Report, is independent and has no vested or financial interests in the proposed development being either approved or rejected. Annexure D contains a copy of signed declaration of independence.

1.8 REPORT 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: Key Findings and recommendations.

SECTION 2: DESCRIPTION OF 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 fit⁶” of the proposed development therefore constitutes a key aspect of the Socio-Economic Assessment. 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 DEA&DP’s *Guidelines for Social Impact Assessment* (2007).

For the purposes of the meeting the objectives of the SIA the following national, provincial and local level policy and planning documents were reviewed, namely:

- National Development Plan (2011).
- New Growth Path Framework (2010).
- National Infrastructure Plan (2012).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Northern Cape Provincial Growth and Development Plan (NCPGDP) (2014)
- Northern Cape Provincial Spatial Development Framework (NCSDF) (2012)
- Namakwa District Municipality Integrated Development Framework (2019/2020 Revision).
- Namakwa District Climate Change Response Plan (2017-2022).
- Nama Khoi Local Municipality Integrated Development Framework (2019/2020 Revision).
- Khai-Ma Local Municipality Integrated Development Plan (2017-2022).

2.2 NATIONAL DEVELOPMENT PLAN

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

⁶ 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.

Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green, low-carbon economy, is one of these challenges.

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

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

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

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

2.3 NEW GROWTH PATH FRAMEWORK

Government released the New Economic Growth Path_Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: *energy*, transport, communication, water, and housing.

2.4 NATIONAL INFRASTRUCTURE PLAN

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

healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, **electricity plants**, hospitals, schools, and dams will contribute to improved economic growth.

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

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

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

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

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP 2010).

SIP 9: Electricity generation to support socio-economic development

- Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.

SIP 10: Electricity transmission and distribution for all

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.

2.5 INTEGRATED ENERGY PLAN

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

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

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.

- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

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

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

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

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

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth.

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

In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports

increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy.

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

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

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

2.6 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) FOR WIND AND SOLAR PV ENERGY IN SOUTH AFRICA

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015) identified eight (8) **Renewable Energy Development Zones** (REDZs) and five (5) **Transmission Corridors**. The REDZs identified areas where large scale wind energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The proposed Sol Invictus power line is located within the Springbok REDZ and Northern Transmission Corridor (Figure 2.1).

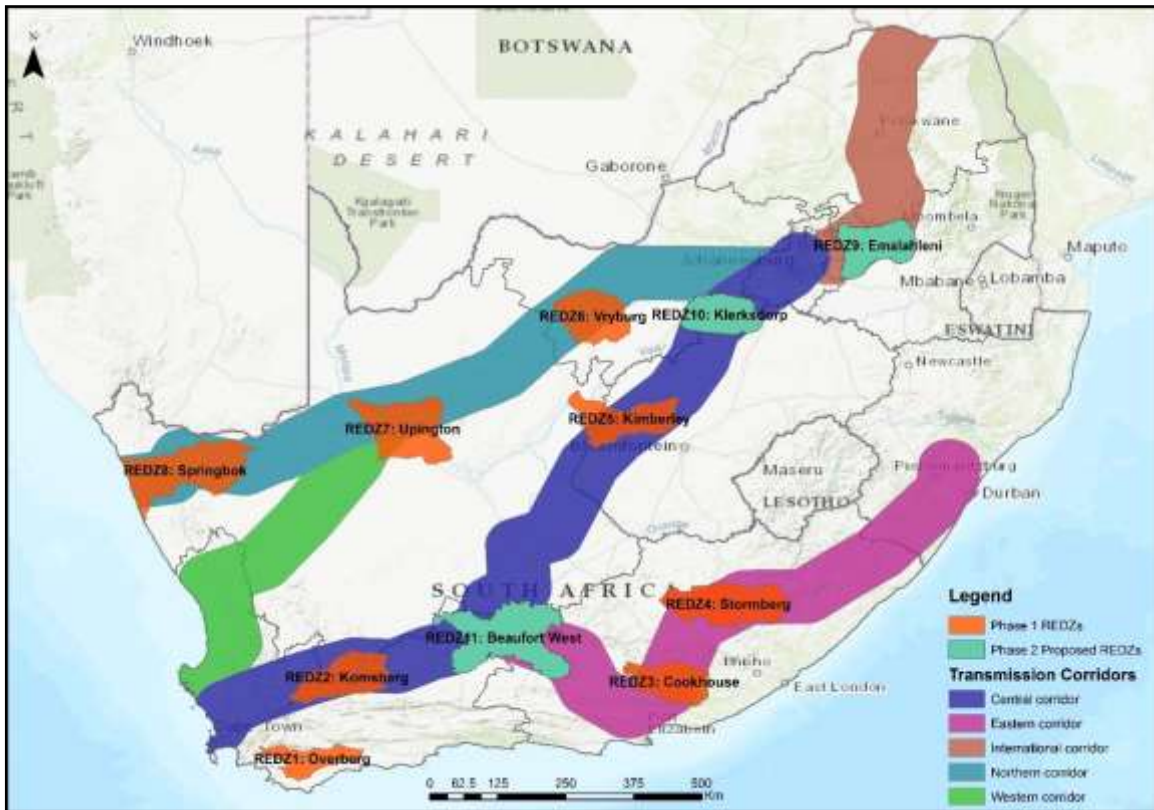


Figure 2.1: Location of Renewable Development Zones and Transmission Corridors in South Africa (Source CSIR)

2.7 NORTHERN CAPE PROVINCE PROVINCIAL GROWTH AND DEVELOPMENT STRATEGY

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

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

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

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

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

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

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

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

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

2.8 NORTHERN CAPE PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK

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

- Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government;
- Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development;

- Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism;
- Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism; and
- Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

Under Section B 14.4, Energy Sector, the NCSDF (2012), notes the total area of high radiation in South Africa amounts to approximately 194 000 km² of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km² of mirror surface in a solar thermal power station were 30.2 MW and only 1% of the area of high radiation were available for solar power generation, then generation potential would equate to approximately 64 GW. A mere 1.25% of the area of high radiation could thus meet projected South African electricity demand in 2025 (80 GW) (NCPSTDF, 2012). However, the SDF does indicate that this would require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres.

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

- Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
- Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector.
- Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013.

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

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

2.9 NAMAKWA DISTRICT MUNICIPALITY INTEGRATED DEVELOPMENT PLAN

The Namakwa District Municipality IDP (2019/2020) notes that the vision of the Namakwa DM is: 'Namakwa District, the centre of excellence'. The Mission statement for the MD includes:

- Stimulating radical economic and social transformation.
- Fostering partnerships with relevant role-players.
- Supporting and capacitating local municipalities.
- Maintaining transparent and accountable processes.
- Providing local leadership.

Key developmental issues facing the DM include:

- The DM has a large cohort of people in the economically active age category (15-64). This highlights the need for local employment creation.
- The youthful population group (15-34) has increased by 2.4%, further emphasizing the need for local employment creation.
- Between 2004 and 2014, the urbanization rate in the DM has increased from 77.3% to 91.2% and that in the NKLM from 88.4% to 95.3%. These increases in urbanization have increased pressure on local authorities to provide municipal and social services.
- The DM's economic outlook is depressed. This is linked to limited new mining activity and the ongoing drought.

Key developmental priorities identified for the DM include:

- Economic diversification, specifically the development of local agricultural and mining manufacturing sectors.
- New mining and renewable energy projects should be supported.

The IDP notes support for the commitments made in terms of the Paris Accord on Climate Change. The IDP notes that the DM is located in an arid region, prone to droughts, and therefore very vulnerable to global warming.

2.10 NAMAKWA DISTRICT CLIMATE CHANGE RESPONSE PLAN

The Namakwa District Climate Change Response Plan (2017-2022) was developed through the Local Government Climate Change Support program. It includes a climate change vulnerability assessment and associated climate change responses which address these vulnerabilities. The vulnerability assessment identified 17 of the DM's socio-economic indicators which are both very exposed and highly sensitive to climate change but have very low capacity to adapt. These included the agricultural sector, tourism, water-dependent municipal services and the coastal and marine environment.

Priority responses are identified for the key sectors, including agriculture, biodiversity and habitat conservation, human health, and human settlements. These include mainstreaming climate change preparedness into all future IDPs, and implementation of a Namakwa Renewable Energy Strategy which supports the development and use of non-fossil sources of energy.

2.11 NAMA KHOI LOCAL MUNICIPALITY INTEGRATED DEVELOPMENT PLAN

The Nama Khoi IDP (2019/2020) Strategic Objectives are aligned with the 2010 National Outcomes and 2012 National Development Plan, and include:

- Fostering the growth of an effective and efficient skilled workforce.
- Maintaining a healthy and safe environment.
- Expanding and strengthening relationships with LED stakeholders.
- Sustainable delivery of basic services.
- Effective land use management.
- Mainstreaming sustainability and optimizing resource efficiency.

The IDP notes that the closure of mines in the LM and DM has hit communities very hard, contributing to high poverty rates. At the same time, the LM has seen a mushrooming of small-scale farmers, as former labour sending communities try to find an alternative source of livelihoods.

2.12 KHAI-MA INTEGRATED DEVELOPMENT PLAN 2017-2022

The Khai-Ma IDP (2017/2022) lists five Key Performance Areas (KPAs) developed to guide how the municipality must respond to the identified (and prioritised) community needs and challenges. The objectives are listed and linked to outcomes, predetermined objectives (PDO) and aligned with the higher-order 'performance directives. The SOs are:

- KPA 1 Infrastructure Development and Basic Service Delivery.
- KPA 2 Institutional Development and Transformation.
- KPA 3 Economic Development.
- KPA 4 Financial sustainable and viability.
- KPA 5 Good governance and public participation.

KPA 1 and 3 are relevant to the proposed development.

SECTION 3: OVERVIEW OF THE STUDY AREA

3.1 INTRODUCTION

Section 3 provides an overview of the study area with regard to:

- The relevant administrative context.
- The municipal level socio-economic context.

3.2 ADMINISTRATIVE CONTEXT

The NKM and KMM are two of six local municipalities that make up the Namakwa District Municipality (NDM) (Figure 3.1). The towns of Springbok and Pofadder are the administrative seats of the NKM and KMM, respectively. The Sol Invictus PV Solar Cluster is in Ward 1 of the NKM, while portion of the powerline is located within the NKM and KMM. The closest settlement to the SEFs is the mining town of Aggenys, ~ 20 km to the north east of the site. Aggenys is located in the KMM. The town of Pofadder, which serves as the administrative seat of the KMM, is located 71 km to the north east of the site. Springbok, the administrative seat of the NKM, is located 87 km to the south west of the site. Pofadder is the largest of the settlement in the area, with a population of 3 663, followed by Aggenys, 2 262.



Figure 3: Local municipalities within Nama District Municipality

3.3 SOCIO-ECONOMIC OVERVIEW-NAMA KHOI MUNICIPALITY

3.3.1 Demographics⁷

Population

The population in the NKM in 2016 was 46 513. The number of households was 14 547, with an average household size of 3.2. The population of Ward 1 in 2011 was 5 082. The total number of households was 1 494, with an average household size of 3.4.

Most of the population in the NKM is Coloured (93%), followed by Whites (5.6%) and Black Africans (1.4%). The dominant language within the Municipality is Afrikaans (97.4%) (Household Community Survey, 2016). In terms of Ward 1, the majority of the population was also Coloured (97.4%), followed by Black Africans (1%) and Whites (0.7%). The dominant language was Afrikaans (98.5%) (Census 2011).

Based on the 2016 Household Community Survey 28.1% of the population of the NKM were under the age of 18, 61.5% were 18 to 64 and the remaining 10.5% were 65 and older. Based on these figures the dependency ratio for the NKM in 2016 was 63. The 2011 figures for Ward 1 were 31.81% under the age of 18, 58.5% between 18 to 64 and the remaining 9.6% 65 and older. Based on these figures the dependency ratio for Ward 1 was 71. As indicated by the data, a high percentage of the population in Ward 1 were under the age of 18.

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. A high dependency ratio also reflects the limited employment opportunities in the area and represent a significant risk to the local and district municipality.

The traditional approach to measuring the dependency ratio is to use figures of 0-14 years of age and 15-65, and 65 and over. Using the above figures will result in a higher dependency ratio. However, it is likely to be more accurate given that the majority of the population under the age of 18 are or should be at school and are likely to be residing with their parents as opposed to working. Based on this approach the provincial and national dependency ratios in 2011 were 55.7 and 52.7, respectively. The dependency ratio for Ward 1 was therefore significantly higher than the provincial and national levels.

Households, house types and ownership

The number of households in the NKM was 14 547 in 2016. There was a total of 1 494 (2011) households in Ward 1. Of these 95.1% were formal houses and 1.7% were apartments. The majority of dwellings in Ward 1 are therefore formal structures. In terms of ownership, 67% of houses are owned and fully paid off, 7.7% are owned, but not paid off, 7.9% were rented and 6.8% were occupied rent free. The high number of formal houses, together with the high percentage of houses that are owned and fully paid off reflects a relatively stable community.

⁷ The focus of the overview is on the NKM and Ward 1, which is where the four SEF sites are located.

Approximately 43% of the households in Ward 1 were headed by women. The figure is higher than the district level (36.5%) provincial level (38.5%). Women headed households tend to be more vulnerable and reflect a lack of employment opportunities in the area, which result in the men leaving to seek employment in larger towns, such as Springbok, Upington, Cape Town and Saldanha Bay.

Household income

Based on the data from the 2011 Census, 9.5% of the population of the NKM have no formal income, 2.5 % earn under R 4 800, 5.1% earn between R 5 000 and R 10 000 per annum, 17.7% between R 10 000 and 20 000 per annum and 20.6% between R 20 000 and R 40 000 per annum (Census 2011)⁸. The figures for Ward 1 were 5.4%, 1.6%, 5.7%, 13.7% and 25.6% respectively.

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 55.4% of the households in the NKM and 52% in Ward 1 live close to or below the poverty line. The low-income levels reflect the limited formal employment opportunities in the area. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the NKM. This in turn impacts on the ability of the NKM to maintain and provide services. The current (2021) percentage of households living on or below the poverty line is likely to be higher due to the impact of the COVID-19 pandemic.

Indigent households

The total number of indigent households registered in the Namakwa District in 2016 was 11 537. Of this total, the NKM had the highest number of indigent households, namely 5 045 (44%) households. The IDP notes that not all of the indigent households benefit from free basic services. However, the majority of households within the NKM have access to services (i.e. water, electricity, sanitation, and refuse removal).

Employment

The official unemployment rate in the NKM in 2016 was 11.6%, with 43% falling within the not economically active group and 6.2% being classified as discouraged work seekers. The figures for Ward 1 (2011) were 10.4%, with 49% falling within the not economically active group and 5.9% being classified as discouraged work seekers. The unemployment rate was lower than the district (11.1%) and provincial (14.5%) rate. However, the current (2021) unemployment rates are likely to be higher due to the impact of the COVID-19 pandemic.

Education

The data from the 2016 Community Survey indicates that 1.4% of the population over 20 years of age had no education, 8.5% had a primary school level education and 26% had passed matric. 2.9% had achieved an undergraduate degree and 1.6% a

⁸ There is no data on household income from the 2016 Household Community Survey for the NKM Ward 1.

postgraduate qualification. The matriculation figures are marginally better than the provincial figure (25.2%), but lower than the national (28.4%) average. Low education levels, specifically higher education, therefore, remains a challenge in the NKM.

The figures for Ward 1 indicate that 1.9% of the population had no education. This figure is lower than the district and provincial level. The figures for the percentage of the population over the age of 20 with matric (23.6%) was higher than the district figure (21.5%), but marginally lower than the provincial level (25.2%). Only 1.5% had achieved an undergraduate degree and 0.4% a postgraduate qualification (Table 3.1). The low percentage the population with an undergraduate and or postgraduate qualifications in Ward 1 is likely to have implications in terms of meeting local employment targets during the construction phase, and to a lesser extent the operational phase of the Sol Invictus projects.

Table 3.1: Population by highest educational level

Column	Nama Khoi Ward 1		Namakwa		Northern Cape	
None	1.9%	61	6.3%	4,794	11.1%	76,861
Other	0.2%	8	0.2%	184	0.3%	1,746
Some primary	18.5%	610	17.1%	12,928	16.8%	116,114
Primary	10.8%	357	9.7%	7,332	6.2%	43,111
Some secondary	42.8%	1,411	37.9%	28,744	34.2%	236,956
Grade 12 (Matric)	23.6%	777	21.5%	16,290	25.2%	174,210
Undergrad	1.5%	49	2.4%	1,825	2.7%	18,802
Post-grad	0.4%	13	1%	729	1.2%	8,254
N/A	0.3%	9	3.9%	2,946	2.4%	16,755

Source: Wazimap: 2011 Census

3.3.2 Municipal service levels

Access to water

Based on the 2011 Census, 96.2% of households in Ward 1 were provided with water by a service provider, namely the NKM. 1.4% rely on a vendor and 0.9% rely on boreholes (Table 3.2). The high number of households that provided with water by a service provider reflects a high level of service delivery.

Table 3.2: Population by water access

Column	Nama Khoi Ward 1		Namakwa		Northern Cape	
Service provider	96.2%	4,890	85.2%	98,720	85.4%	978,825
Vendor	1.4%	73	0.2%	208	0.5%	6,038
Borehole	0.9%	45	8.2%	9,536	5.9%	67,242
Other	0.9%	44	1.2%	1,425	2%	22,673

Source: Wazimap: 2011 Census

Sanitation

Based on 2011 Census, 67.4% of the households in Ward 1 had flush toilets, 16% relied on pit latrines with ventilation, 7.1% on chemical toilets, and 6.2% on pit latrines without ventilation. It would appear that no households had no access to sanitation facilities. The figures in terms of access to flush toilets are similar to the district and provincial figures for flush toilets (Table 3.3).

Table 3.3: Population by sanitation access

Column	Nama Khoi Ward 1		Namakwa		Northern Cape	
Flush toilet	67.4%	1,006	70.7%	24,456	66%	207,095
Pit latrine with ventilation (VIP)	16%	239	15.2%	5,247	8.9%	27,988
Chemical toilet	7.1%	106	0.9%	313	0.6%	1,987
Pit latrine without ventilation	6.2%	93	4.5%	1,559	10.4%	32,772
Other	3.3%	49	8.8%	3,043	14%	43,953

Source: Wazimap: 2011 Census

Refuse collection

97.3% of the households in Ward 1 had their waste collected by a service provider on a regular basis, while 2% relied on their own dump and 0.6% had not access to refuse disposal facilities (Table 3.4). The high number of households that are serviced on a regular basis reflects a high level of service delivery.

Table 3.4: Population by refuse access

Column	Nama Khoi Ward 1		Namakwa		Northern Cape	
Service provider (regularly)	97.3%	4,942	85.4%	98,900	67.4%	771,733
Own dump	2%	100	9%	10,418	21.7%	248,965
None	0.6%	29	1.7%	1,943	4.9%	56,171
Unspecified	0.1%	6	0.2%	229	0.3%	3,819
Other	0.1%	5	3.8%	4,352	5.7%	65,173

Source: Wazimap: 2011 Census

3.4 SOCIO-ECONOMIC OVERVIEW-KHAI MA MUNICIPALITY

As indicated above, the focus of the Needs Assessment is on the settlements of Pella, Witbank, Onseepkans and Pofadder, located in the KMM. The towns of Aggenys, Witbank and Pofadder are located in Ward 4. An overview of the KMM and Ward 4 is provided below.

3.4.1 Demographics

Population

The population in the KMM in 2016 was 12 344. The number of households was 4 079, with an average household size of 3. The population of Ward 4 in 2011 was 3 638. The total number of households was 1 106, with an average household size of 3.3.

Most of the population in the KMM is Coloured (89.2%), followed by Whites (7.1%) and Black Africans (2.8%). The dominant language within the Municipality is Afrikaans (94.9%) (Household Community Survey, 2016). In terms of Ward 4, the majority of the population was also Coloured (65.8%), followed by Whites (17.2%) and Black Africans (15.8%). The dominant language was Afrikaans (79.3%) followed by IsiXhosa (8.1%) (Census 2011).

Based on the 2011 Census data 29.5% of the population of Ward 4 were under the age of 18, 66.3% were 18 to 64 and the remaining 4.2% were 65 and older. Based on these figures the dependency ratio for Ward 4 in 2011 was 50.

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. A high dependency ratio also reflects the limited employment opportunities in the area and represent a significant risk to the local and district municipality.

The traditional approach to measuring the dependency ratio is to use figures of 0-14 years of age and 15-65, and 65 and over. Using the above figures will result in a higher dependency ratio. However, it is likely to be more accurate given that the majority of the population under the age of 18 are or should be at school and are likely to be residing with their parents as opposed to working. Based on this approach the provincial and national dependency ratios in 2011 were 55.7 and 52.7, respectively. The dependency ratio for Ward 4 was therefore lower than the provincial and national levels.

Households, house types and ownership

The number of households in the KMM was 4 079 in 2016. There was a total of 1 106 (2011) households in Ward 4. Of these 87.9% were formal houses, 1.8% were apartments and 3.9% were shacks. The majority of dwellings in Ward 4 are therefore formal structures. In terms of ownership, 20.8% of houses are owned and fully paid off, 2.5% are owned, but not paid off, 57.1% were rented and 15.1% were occupied rent free. The high number of rented structures is likely to be linked to the mining activities at Aggenys where the properties are owned by the mining company and rented out to employees.

Approximately 20.4% of the households in Ward 4 were headed by women. The figure is significantly lower than the district level (36.5%) provincial level (38.5%). However, despite the lower percentage of women headed households, women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 4.9 % of the population of the KMM have no formal income, 1.7 % earn under R 4 800, 6.7 % earn between R 5 000 and R 10 000

per annum, 40.9% between R 10 000 and 20 000 per annum and 13.9% between R 20 000 and R 40 000 per annum (Census 2011)⁹. The figures for Ward 4 were 5.2%, 2.8%, 3.1%, 11.6% and 14.1% respectively.

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 68.1% of the households in the KMM and 36.8% in Ward 4 live close to or below the poverty line. The income levels in Ward 4 are therefore higher than those in the KMM. The low-income levels in the KMM reflect the limited formal employment opportunities in the area and the dependence on seasonal employment in the agricultural sector. This is also reflected in the high unemployment rates. The low-income levels in the KMM 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 KMM. This in turn impacts on the ability of the KMM to maintain and provide services. The current (2021) percentage of households living on or below the poverty line is likely to be higher due to the impact of the COVID-19 pandemic.

Indigent households

The total number of indigent households registered in the Namakwa District in 2016 was 11 537. Of this total, the KMM had the second highest number of indigent households, namely 1 752 (15%) households.

Employment

The official unemployment rate in Ward 4 in 2011 was 6.4%, with 33.9% falling within the not economically active group and 3% being classified as discouraged work seekers. The unemployment rate for Ward 4 was lower than the district (11.1%) and provincial (14.5%) rate. However, the current (2021) unemployment rates are likely to be higher due to the impact of the COVID-19 pandemic.

Education

The data from the 2016 Community Survey indicates that 2.8% of the population over 20 years of age in the KMM had no education, 6.7% had a primary school level education and 23.3% had passed matric. 3.1% had achieved an undergraduate degree and 0.6% a postgraduate qualification. The matriculation figures are lower than the provincial figure (25.2%) and national (28.4%) average. Low education levels, specifically higher education, therefore, remains a challenge in the KMM.

The figures for Ward 5 indicate that 2.3% of the population had no education. This figure is lower than the district and provincial level. The figures for the percentage of the population over the age of 20 with matric (29.7%) was higher than the district figure (21.5%) and provincial level (25.2%). 3.7% had achieved an undergraduate degree and 2.2% a postgraduate qualification (Table 3.5). These figures are also higher than the district figure (2.4% and 1%) and provincial level (2.7 and 1.2%). Despite this the relatively low percentage of the population with an undergraduate and or postgraduate qualifications in Ward 4 is likely to have implications in terms of

⁹ There is no data on household income from the 2016 Household Community Survey for the KMM and Ward 4.

meeting local employment targets during the construction phase, and to a lesser extent the operational phase of the Sol Invictus projects.

Table 3.5: Population by highest educational level

Column	Khâi-Ma Ward 4		Namakwa		Northern Cape	
None	2.3%	57	6.3%	4,794	11.1%	76,861
Other	0.4%	10	0.2%	184	0.3%	1,746
Some primary	8.7%	215	17.1%	12,928	16.8%	116,114
Primary	4.2%	104	9.7%	7,332	6.2%	43,111
Some secondary	39.2%	965	37.9%	28,744	34.2%	236,956
Grade 12 (Matric)	29.7%	731	21.5%	16,290	25.2%	174,210
Undergrad	3.7%	91	2.4%	1,825	2.7%	18,802
Post-grad	2.2%	54	1%	729	1.2%	8,254
N/A	9.6%	236	3.9%	2,946	2.4%	16,755

Source: Wazimap: 2011 Census

3.4.2 Municipal service levels

Access to water

Based on the 2011 Census, 85% of households in Ward 4 were provided with water by a service provider, namely the KMM. 10.2% relied on boreholes and 2.5% on the Gariep (Orange) River (Table 3.6). The high percentage that relies on boreholes reflects the rural nature of the area. Due to the rural, dispersed nature of the area, it is both difficult and costly to provide municipal services, hence the reliance on boreholes.

Table 3.6: Population by water access

Column	Khâi-Ma Ward 4		Namakwa		Northern Cape	
Service provider	85%	3,094	85.2%	98,720	85.4%	978,825
Borehole	10.2%	371	8.2%	9,536	5.9%	67,242
River	2.5%	89	1.6%	1,873	1.8%	21,008
Tanker	0.9%	32	0.8%	877	2.1%	24,299
Other	1.5%	53	4.2%	4,836	4.8%	54,488

Source: Wazimap: 2011 Census

Sanitation

85.9% of the households in Ward 4 had flush toilets, 5.5% relied on pit latrines with ventilation, and 3.3% had no access to sanitation facilities. The figures in terms of access to flush toilets are higher than the district and provincial figures for flush toilets (Table 3.7).

Table 3.7: Population by sanitation access

Column	Khâi-Ma Ward 4		Namakwa		Northern Cape	
Flush toilet	85.9%	953	71.3%	24,456	66.4%	207,095
Pit latrine with ventilation (VIP)	5.5%	61	15.3%	5,247	9%	27,988
None	3.3%	37	5.7%	1,940	8.2%	25,586
Pit latrine without ventilation	2.3%	25	4.5%	1,559	10.5%	32,772
Other	3.1%	34	3.2%	1,103	5.9%	18,367

Source: Wazimap: 2011 Census

Refuse collection

81% of the households in Ward 4 had their waste collected by a service provider (KMM) on a regular basis, while 7.4% relied on their own dump and 4.2% were serviced by the local service provider, but not on a regular basis (Table 3.8). The relatively high percentage of households that rely on their own and or communal refuse dumps reflects the rural nature of Ward 4.

Table 3.8: Population by refuse access

Column	Khâi-Ma Ward 4		Namakwa		Northern Cape	
Service provider (regularly)	81%	2,948	85.4%	98,900	67.4%	771,733
Own dump	7.4%	269	9%	10,418	21.7%	248,965
Service provider (not regularly)	4.2%	153	2%	2,311	2.3%	26,678
Other	4.2%	151	0.9%	1,048	1.7%	19,953

Source: Wazimap: 2011 Census

3.5 ECONOMIC OVERVIEW-KHAI MA MUNICIPALITY

In terms of GGDP, the most important sector is the mining sector with a 56%, followed by the community services (12%). Khâi-Ma LM is rich in minerals deposits. South Africa's main source of lead production is from Aggeneys. The main zinc deposits in the Northern Cape Province can be found at Gamsberg near Aggeneys.

Mining is dominated by Vedanta Zinc International (VZI), acquired Black Mountain and Gamsberg Mine from Anglo American in 2011. Since then, VZI has invested considerable resources into developing the Gamsberg Mine. The combined entity, Black Mountain and Gamsberg, is known as the Black Mountain Mining Complex (BMC). A total of 2,863 people (including business partners) are currently employed within the BMC. This is made up of 1 692 at Black Mountain and 1 711 at the Gamsberg Mine. Other mining operations include the Bosluispan Mine managed by Kori Diamond Mining (Pty) Ltd (Diamonds and Salt) and Aroams Quarry.

The IDP notes that an application for the establishment of the Namakwa Special Economic Zone (SEZ) in vicinity of the Aggeneys and Gamsberg Zinc mine has been made. The SEZ will include a smelter and associated industries. The IDP indicates that the SEZ would create about 6000 permanent and temporary jobs. The Northern Cape Department of Economic Development and Tourism in conjunction with the national Department of Trade and Industry is preparing the final documents for the declaration of a Namakwa Special Economic Zone.

Agriculture includes both commercial and emerging, small scale farming, with a focus on livestock (sheep, goats and cattle). Irrigation also take place along the Gariep River. The main crops are grapes (table, raising and wine). The Department of Agriculture and Rural Development also supports the Pella community farming operations that are linked to raisin and table grapes. Vedanta Zinc International- Black Mountain Complex also supports small farmers by equipping boreholes and other needs. Abengoa Solar also supports local small-scale farmers at Onseepkans.

There are also a number of renewable energy facilities in the KMM, including Abengoa's Khaxu Solar One, a 100MW concentrated solar power (CSP) plant located north of Pofadder.

SECTION 4: ASSESSMENT OF 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.
- Review of the VIA (Logis August 2021).
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar projects.

The assessment section is divided into the following sections:

- Assessment of compatibility with relevant policy and planning context (“planning fit”).
- Assessment of social issues associated with the construction phase.
- Assessment of social issues associated with the operation phase.
- Assessment of the “no development” alternative.
- Assessment of cumulative impact on sense of place.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The findings of the SIA indicate that investment in renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy and associated energy distribution infrastructure is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure.

The proposed powerline is also located within the Springbok REDZ and Northern Transmission Corridor. The development of the proposed powerline is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

The findings of the SIA indicate that social impacts associated with the construction of a 23 km overhead powerline will be low to negligible.

Potential positive impacts

- Creation of employment and business opportunities.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impact on local farmers and farming operations.

- Noise, dust and safety impacts of construction related activities and vehicles.

4.3.1 Creation of local employment, training, and business opportunities

Based on similar projects the construction phase for the grid connection will extend over a period of approximately 3-6 months and create in the region of 30-40 employment opportunities. Approximately 80% of the jobs will be low-skilled, 15% semi-skilled and 5% skilled. Most of the low and semi-skilled employment opportunities would benefit community members from local towns in the area, including Aggeney, Poffadder and Keimoes. A percentage of the high skilled positions may also benefit the local community. Most of the employment opportunities are also likely to accrue to Historically Disadvantaged (HD) members from these local communities. Given high local unemployment levels and limited job opportunities in the area, this will represent a localised, social benefit. The remainder of the skilled employment opportunities are likely to be associated with the contactors appointed to construct the grid infrastructure. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. The proponent should therefore commit to employing as many local community members as possible. The total wage bill will be in the region of R 1.5 million (2021 Rand values). This is based on assumption of R 8 000 per month for low skilled workers, R 12 000 per month for semi-skilled workers and R 25 000 per month for high skilled workers over 4 months. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local municipality. The capital expenditure associated with the construction of grid infrastructure will be ~ R 25 million and will create opportunities for local companies and the regional and local economy. Implementing the enhancement measures listed below can enhance these opportunities. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the project and short duration of the construction phase these benefits will be limited.

Table 4.1: Impact assessment of employment 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	Low (2)	Low (2)
Reversibility	N/A	N/A
Probability	Probable (3)	Highly probable (4)
Significance	Low (18)	Low (28)
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

- 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 NKM and KMM 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 NKM and KMM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

4.3.2 Impact of construction workers on local communities

The presence of construction workers can pose a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.

- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

Most of the low and semi-skilled workers are likely to be locally based and form part of the local family and social network and the number of workers will be low, namely ~ 30-40. The towns of Aggeneys and Poffadder have also been exposed to construction workers associated with mining and development of renewable energy projects. They are therefore accustomed to the presence of construction workers. The potential impact of construction workers on the local community is therefore likely to be negligible.

Table 4.2: Assessment of impact of the presence of construction workers in the area on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Very Low (1)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (18)	Low (14)
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 mitigation measures

The potential risks associated with construction workers can be mitigated. The detailed mitigation measures should be outlined in the Environmental Management Plan (EMP) for the Construction Phase. Aspects that should be covered include:

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation.

- The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the 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 Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site will pose a limited risk to local farmers and farm workers in the vicinity of the site. This is due to the low intensity of the farming activities in the area due to the low carrying capacity of the veld. As indicated below, the owners of Witputs Farm, which is the closest farmstead to the powerline, support the development of the Sol Invictus PV SEF.

Potential risks (safety, livestock, and farm infrastructure) can be also effectively mitigated by careful planning and managing the movement of construction workers on the site during the construction phase. Mitigation measures to address these risks are outlined below.

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

Nature: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Very Low (1)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (18)	Low (14)
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

- 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 consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below).
- The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
- Contractors appointed by 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 Code of Conduct. All dismissals must be in accordance with South African labour legislation.
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.4 Impacts associated with construction related activities

The movement of heavy construction vehicles during the construction phase has the potential to damage local roads and create noise, dust, and safety impacts for other road users and local communities in the area. Given the location of the proposed powerline the potential dust and noise impacts associated with the construction of the power line are likely to be negligible. As indicated below, the owners of Witputs Farm, which is the closest farmstead to the powerline, support the development of the Sol Invictus PV SEF.

Table 4.4: 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:

- As indicated above, the proponent should consider the establishment of a Monitoring Forum (MF) to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.
- Ongoing communication with land owners and road users during construction period.
- Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.
- Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition.
- 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.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

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

Potential positive impacts

- Improved energy security and establishment of energy infrastructure.
- Creation of employment opportunities.

Potential negative impacts

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

4.4.1 Improved energy security and establishment of energy infrastructure

The proposed power line is essential to enable the development and operation of Sol Invictus PV Solar Cluster (PV 1-6). The primary goal of the proposed Sol Invictus PV Solar Cluster is to improve energy security in South Africa by generating renewable energy. The proposed power line should therefore be viewed within the context of the South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs.

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators¹⁰. 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 period¹¹.

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

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

Table 4.5: Improve energy security, reduce reliance on coal generated power sector

Nature: Development of infrastructure to improve energy security and reduce reliance on coal		
	Without Mitigation¹²	With Mitigation¹³
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (3)	Moderate (3)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (44)	Medium (55)
Status	Negative	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Improved energy security and benefit for economic development and investment, reduction in CO ₂ emission and reduction in water consumption for energy generation.		

Assessment of No-Go option

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

Recommended mitigation measures

Should the proposed grid connection infrastructure be approved the proponent should:

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

4.4.2 Creation of employment opportunities

The potential employment opportunities associated with the power line will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits will therefore be limited.

¹² Assumes power line is not established

¹³ Assumes power line is established

Table 4.6: Impact assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	With Enhancement
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Very Low (1)	Low (2)
Reversibility	N/A	N/A
Probability	Low Probability (2)	Probable (3)
Significance	Low (12)	Low (24)
Status	Positive	Positive
Reversibility	N/A	
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.

4.4.3 Visual impact and impact on sense of place

The VIA (Logis August 2021) notes that the grid connection infrastructure may theoretically be visible within the 3km visual corridor and potentially highly visible within a 500 – 1 500m radius of the structures due to the generally flat terrain it traverses. Beyond 1 500m the visibility becomes more scattered due to the undulating nature of the topography as well as the presence of inselbergs. The grid connection structures are unlikely to be visible beyond a 3km radius of the structures. In terms of exposure, most of the exposed area falls within vacant open space, generally devoid of observers or potential sensitive visual receptors. The only homestead within a 500m radius of the proposed power line is the Witputs residence, located partially on the property identified for the Sol Invictus Solar PV facilities. The power line will traverse north and west of this residence at a distance of 120m at the closest. The VIA notes that the owner of Witputs support the future Solar PV facilities and associated grid connection infrastructure.

Visual exposure within a 500m – 1 500m radius includes a section of the N14 national road. The busbar (or extension to the Aggeneis Substation) is located at a distance of approximately 570m from the N14 at the closest. Although the busbar and power line may theoretically be visible from this road, the visibility will not be in isolation due to the existing substation structures and the large number of power lines at this location. The VIA notes that it is unlikely that observers travelling along this road would be able

to distinguish the proposed Sol Invictus power line and busbar from the existing grid connection infrastructure.

Visual exposure beyond a 1.5km radius of the power line structures includes a section of the Black Mountain Mine at the Deeps Shaft. Given the activities and structures at the mine (e.g. buildings, mining equipment, mine dumps, etc.), the observers (employees) are unlikely to notice the power line, or would be indifferent to the power line structures. Due to the very remote location of the proposed power line and substation, and the sparsely populated nature of the receiving environment, there are only four potential sensitive visual receptor sites located within the study area. These are the residents of, or visitors, to Suurwater, Kamasoas, Aggeneys (original homestead) and Witputs. Only the Witputs residence is located in closer proximity (i.e. within 3km) to the grid connection infrastructure. As indicated above, the owners of Witputs support the development of the Sol Invictus PV SEF.

The specific findings of the VIA include:

Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase

The findings of the VIA note that the power line is expected to have a **low** visual impact (significance rating = 26) on observers within a 0.5km radius of the power line structures. This is due to the absence of potentially sensitive visual receptors brought about by the remote location of the infrastructure.

Potential visual impact on sensitive visual receptors within the region (0.5 – 3km radius) during the operation of the grid connection infrastructure

The VIA notes that the grid connection infrastructure will have a **low** visual impact (significance rating = 26) on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure. The area of potential visual impact (i.e. a section of the N14 national road) is unlikely to be affected, due to the existing substation structures and the large number of power lines at this location. It is unlikely that observers travelling along this road would be able to distinguish the proposed Sol Invictus power line and busbar from the existing grid connection infrastructure.

The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

The VIA notes that the anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance.

The VIA concludes that the grid connection infrastructure for the Sol Invictus Solar PV facilities is acceptable from a visual impact perspective.

Table 4.7: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed grid infrastructure and the potential impact on the area’s sense of place.		
	Without Mitigation	With Mitigation¹⁴
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible (1)	Reversible (1)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (27)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: Potential impact on current rural sense of place		

Assessment of No-Go option

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

Recommended mitigation measures

Recommendations of VIA should be implemented.

4.4.4 Impact on farming operations during maintenance

The presence on and movement of maintenance workers on and off the site poses a potential risk to farming operations. Farm fence and gates may be damaged and stock losses may also result from gates being left open. The presence of maintenance workers on the site also increases the exposure of their farming operations and livestock to the outside world, which, in turn, increased the potential risk of stock theft and crime. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by ensuring the maintenance teams take care to ensure that gates are kept closed and affected property owners are kept informed about timing of maintenance operations. Mitigation measures to address these risks are outlined below.

¹⁴ Not possible to effectively mitigated visual impacts

Table 4.8: Assessment of risk to farming operations and damage to farm infrastructure

Nature: Potential risk to safety to farming operations and livestock associated with the presence of maintenance workers on the site		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Recoverable with compensation paid for stock losses and damage to farm infrastructure etc. (3)	Recoverable with compensation paid for stock losses and damage to farm infrastructure etc. (3)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (27)
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

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

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues raised in these guidelines as to what defines a cumulative impact are also regarded as pertinent to transmission lines. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more transmission lines) will be visible from one location).
- Sequential visibility (e.g., the effect of seeing two or more two or more transmission lines) along a single journey, e.g. road or walking trail).

- The visual compatibility of different two or more transmission lines in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

In terms of cumulative impacts, the VIA notes that the large number of approved renewable energy generation applications within the Springbok REDZ and this area in particular, is expected to increase the cumulative visual impact should all of these projects be constructed, both for the primary project components and for the ancillary components (i.e. grid connection infrastructure).

However, considering purpose of the establishment of the Springbok REDZ (i.e. to concentrate renewable energy applications within this area) the cumulative visual impact is considered to be within acceptable limits.

The VIA concludes that the grid connection infrastructure for the Sol Invictus Solar PV facilities is acceptable from a visual impact perspective.

Table 4.9: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of associated grid infrastructure and the potential impact on the area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (2)	Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (4)
Reversibility	Reversible (1)	Reversible (1)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Moderate (30)
Status	Negative	Negative
Can impacts be mitigated?	Limited	
Mitigation: See below		

Assessment of No-Go option

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

Recommended mitigation measures

Recommendations of VIA should be implemented.

4.6 ASSESSMENT OF NO-DEVELOPMENT OPTION

The proposed power line is essential to enable the proposed Sol Invictus PV Solar Cluster to connect to the national electricity grid to address the current energy supply constraints and reduce South Africa's reliance on coal generated energy. As indicated above, energy supply constraints and associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South

Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions.

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

Table 4.10: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to improve energy security and reduce reliance on coal power.		
	Without Mitigation¹⁵	With Mitigation¹⁶
Extent	Local-National (3)	Local-National (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Reversibility	Reversible (1)	Reversible (1)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	Moderate (56)
Status	Negative	Positive
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Improved energy security and benefit for economic development and investment, reduction in CO ₂ emission and reduction in water consumption for energy generation.		

Recommended enhancement measures

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

¹⁵ Assumes power line is not developed

¹⁶ Assumes power line 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:

- Review of project related information.
- Review of key policy and planning documents.
- Site visit to the study area.
- Review of the VIA (Logis August 2021).
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar 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.
- No-development option.

5.2.1 Policy and planning issues

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

5.2.2 Construction phase impacts

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 3-6 months and create in the region of 30-40 employment opportunities. The total wage bill will be in the region of R 1.5 million (2021 Rand values). Most of the low and semi-skilled employment opportunities are likely to benefit residents from local towns in the area, including Aggeneys, Poffadder and Keimoes. Most the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a

short term positive social benefit in an area with limited employment opportunities. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in MM.

The capital expenditure associated with the construction of power line will be ~25 million (2021 Rand values) and will create opportunities for the local and regional and local economy. The sector of the local economy most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the development and short construction period the benefits will be limited.

Potential negative impacts

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

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the proposed construction of the power line can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

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

5.2.3 Operational phase impacts

The benefits associated with the Sol Invictus PV Solar Cluster are dependent upon being able to connect to the national grid. The key social issues associated with the operational phase include:

Potential positive impacts

- Improve energy security and establishment of energy infrastructure.

- Creation of employment opportunities.

Potential negative impacts

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

The findings of the SIA indicate that the significance of the potential negative impacts is likely to be negligible. With mitigation they are rated as **Low Negative**. The potential negative impacts associated with the proposed power line can therefore be effectively mitigated if the recommended mitigation measures are implemented.

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

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation / Enhancement	Significance With Mitigation / Enhancement
Improve energy security and establishment of energy infrastructure	Medium (Negative) ¹⁷	High (Positive) ¹⁸
Creation of employment and business opportunities during maintenance	Low (Positive)	Low (Positive)
Visual impact and impact on sense of place	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of maintenance workers	Medium (Negative)	Low (Negative)

5.2.4 Cumulative impact on sense of place

There are a number of other powerlines located in the study area. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more power lines along a single journey, e.g., road or walking trail) does therefore exist. The VIA indicates that there are a large number of approved renewable energy generation applications within the Springbok REDZ, and this is expected to increase the cumulative visual impact both for the primary project components and for the ancillary components (i.e. grid connection infrastructure). However, the VIA notes that given that the area falls within the Western Transmission Corridor the cumulative visual impact is considered to be within acceptable limits.

5.2.5 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable

¹⁷ Assumes powerline is not developed

¹⁸ Assumes powerline is developed

energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a negative social cost.

5.3 CONCLUSIONS AND RECOMMENDATIONS

The energy security benefits associated with the proposed Sol Invictus PV Solar Cluster are dependent upon it being able to connect to the national grid via the establishment of the Sol Invictus grid connection infrastructure.

The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed overhead power line are **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The power line is also located within the Springbok REDZ and Northern Transmission Corridor. The establishment of proposed powerline is therefore supported by the findings of the SIA.

ANNEXURE A

REFERENCES

- National Development Plan (2011).
- New Growth Path Framework (2010).
- National Infrastructure Plan (2012).
- Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015).
- Northern Cape Provincial Growth and Development Plan (NCPGDP) (2014)
- Northern Cape Provincial Spatial Development Framework (NCSDF) (2012)
- Namakwa District Municipality Integrated Development Framework (2019/2020 Revision).
- Namakwa District Climate Change Response Plan (2017-2022).
- Nama Khoi Local Municipality Integrated Development Framework (2019/2020 Revision).
- Khai-Ma Local Municipality Integrated Development Plan (2017-2022).
- Visual Impact Assessment for Sol Invictus Grid Infrastructure (Logis, August 2021).

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 direct¹⁹, indirect²⁰, secondary²¹ as well as cumulative²² 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 criteria²³ presented in **Table 1**.

Table 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

¹⁹ Impacts that arise directly from activities that form an integral part of the Project.

²⁰ Impacts that arise indirectly from activities not explicitly forming part of the Project.

²¹ Secondary or induced impacts caused by a change in the Project environment.

²² Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

²³ 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
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
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

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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 October 2021

Date: