

SOCIAL IMPACT ASSESSMENT
ROODE KRAAL SOLAR MW PV1 SOLAR
ENERGY FACILITY
NORTHERN CAPE PROVINCE

OCTOBER 2024

Prepared

By

Tony Barbour and Schalk van der Merwe

Tony Barbour
ENVIRONMENTAL CONSULTING

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

EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

SES Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Roode Kraal Solar PV1 Solar Energy Facility (SEF) with a capacity of up to 405 MW located approximately 16 km east southeast of the town of De Aar in the Northern Cape Province. The project site is situated within the Emthanjeni Municipality (EM), which is located within the Pixley Ka Seme District Municipality (PKSDM). Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

SUMMARY OF KEY FINDINGS

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

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

POLICY AND PLANNING ISSUES

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and EM IDP also support the development of renewable energy. The development of the proposed PV SEF is therefore supported by key policy and planning documents.

CONSTRUCTION PHASE

Potential positive impacts

- Creation of employment and business opportunities.

The construction phase is expected to extend over a period of ~18-24 months and create approximately 200-250 employment opportunities. Most of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to residents in the area, specifically residents from De Aar. Most of the beneficiaries are likely to be historically disadvantaged (HD) members from the community. This would represent a significant positive social benefit in an area with limited employment opportunities. However, in the absence of specific commitments from the developer to employ local contractors the potential for meaningful skills to local employment targets the benefits for members from the local communities may be limited. In addition, the low education and skills levels in the area may also hamper potential opportunities for local communities.

The potential benefits for local communities are confirmed by the findings of the Overview of the IPPPP undertaken by the Department of Energy, National Treasury

and DBSA (December 2021). The review found that by the end of December 2021 the construction phase of the 85 renewable energy projects that had been successfully completed had created 44 172 job years¹ of employment, compared to the anticipated 30 488. This was 45% more than planned. The study also found that significantly more people from local communities were employed during construction than was initially planned.

The capital expenditure associated with the construction phase will be in the region of R 4.5 billion (2024 Rand value). A percentage of the wage bill will also be spent in the local economy which will create opportunities for local businesses in the EM. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

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

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

Table 1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Moderate (+)	Moderate (+)
Presence of construction workers and potential impacts on family structures and social networks	Low (-)	Low (-)
Influx of job seekers	Low (-)	Low (-)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Moderate (-)	Low (-)
Increased risk of grass	Moderate (-)	Low (-)

¹ The equivalent of a full-time employment opportunity for one person for one year

fires		
Impact of heavy vehicles and construction activities	Moderate (-)	Low (-)
Loss of farmland	Moderate (-)	Low (-)

OPERATIONAL PHASE

Potential positive impacts

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

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

Potential negative impacts

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

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. All the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation	Significance With Mitigation
Promotion of renewable energy projects	Moderate (+)	Moderate (+)
Creation of employment and business opportunities	Low (+)	Moderate (+)
Establishment of Community Trust	Moderate (+)	High (+)
Generate income for affected landowner/s	Low (+)	Moderate (+)
Visual impact and impact on sense of place	Moderate (-)	Low (-)
Impact on tourism	Low (-)	Low (-)
Impact on property values	Low (-)	Low (-)

DECOMMISSIONING PHASE

Given the number of people employed during the operational phase (~ 20-30), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with

the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be **Low Negative**. Decommissioning will also create temporary employment opportunities. The significance was assessed to be Low (positive).

CUMULATIVE IMPACTS

Cumulative impact on sense of place

Several PV SEFs and WEFs are proposed in and or have been established in the EM. The potential for combined and sequential visibility impacts is therefore high. The cumulative impact is rated as **Medium Negative**.

Cumulative impact on local services and accommodation

The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy

The establishment of renewable energy facilities will create significant social and economic opportunities for the EM and PKSDM. The significance of this impact with enhancement was rated as **High Positive**.

NO-DEVELOPMENT OPTION

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

CONCLUSION

The findings of the SIA indicate that the development of the proposed Roode Kraal Solar PV1 and associated infrastructure will create employment and business opportunities for the EM during both the construction and operational phase of the project. All the potential negative impacts, except for the impact on sense of place, can also be effectively mitigated.

The creation of SED initiatives will also benefit the local community. The significance of this impact is rated as **High Positive**. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society. The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.

Statement and reasoned opinion

The establishment of the proposed Roode Kraal Solar PV1 and associated infrastructure is supported by the findings of the SIA.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
SECTION 1: INTRODUCTION	1
1.1 INTRODUCTION.....	1
1.2 TERMS OF REFERENCE AND APPROACH	1
1.3 PROJECT DESCRIPTION	2
1.4 ASSUMPTIONS AND LIMITATIONS	5
1.4.1 Assumptions	5
1.4.2 Limitations.....	5
1.5 SPECIALIST DETAILS	6
1.6 DECLARATION OF INDEPENDENCE.....	6
1.7 REPORT STUCTURE	6
SECTION 2: POLICY AND PLANNING ENVIRONMENT	7
2.1 INTRODUCTION.....	7
2.2 NATIONAL POLICY ENVIRONMENT	7
2.2.1 National Energy Act (Act No 34 of 2008)	7
2.2.2 White Paper on the Energy Policy of the Republic of South Africa	8
2.2.3 White Paper on Renewable Energy	8
2.2.4 Integrated Resource Plan (2019)	9
2.2.5 National Development Plan	11
2.2.6 The New Growth Path Framework	11
2.2.7 National Infrastructure Plan	11
2.2.8 Astronomy Geographic Advantage Act	12
2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING	12
2.3.1 Northern Cape Province Provincial Growth and Development Strategy	12
2.3.2 Northern Cape Provincial Spatial Development Framework	14
2.2.3 Northern Cape Climate Change Response Strategy	15
2.2.4 Northern Cape Province Green Document.....	15
2.3.4 Pixley ka Seme District Municipality Integrated Development Plan	16
2.3.5 Pixley ka Seme District Municipality Spatial Development Framework.....	18
2.3.6 Emthanjeni Local Municipality Integrated Development Plan	23
2.4 OVERVIEW RENEWABLE ENERGY SECTOR IN SOUTH AFRICA	24
2.4.1 Independent Power Producers Procurement Programme (IPPPP): An Overview ..	25
2.4.2 Green Jobs Study.....	32
2.4.3 Powering the Future: Renewable Energy Roll-out in South Africa	34
2.4.4 WWF SA Renewable Energy Vision 2030.....	35
2.4.5 The impact of the green economy on jobs in South Africa	37
2.4.6 Potential for local community benefits	38
SECTION 3: OVERVIEW OF STUDY AREA	39
3.1 INTRODUCTION.....	39
3.2 ADMINISTRATIVE CONTEXT	39
3.3 PROVINCIAL CONTEXT	40
3.4 MUNICIPAL OVERVIEW	43
3.5 MUNICIPAL SERVICES	45
3.6 HEALTH AND COMMUNITY FACILITIES.....	45
3.7 ECONOMIC OVERVIEW	45
3.8 OVERVIEW OF STUDY AREA	46
3.8.1 Introduction	46
3.8.2 Affected properties	50
3.8.3 Relationship to social receptors	53
3.8.4 Relationship to other renewable energy facilities.....	56
SECTION 4: OVERVIEW OF KEY SOCIAL ISSUES	58
4.1 INTRODUCTION.....	58
4.2 ASSESSMENT OF POLICY AND PLANNING FIT	58
4.3 CONSTRUCTION PHASE SOCIAL IMPACTS.....	58
4.3.1 Creation of local employment and business opportunities.....	59
4.3.2 Impact of construction workers on local communities	61

4.3.3	Influx of job seekers.....	63
4.3.4	Risk to safety, livestock, and farm infrastructure	64
4.3.5	Increased risk of grass fires	66
4.3.6	Nuisance impacts associated with construction related activities.....	67
4.3.7	Impacts associated with loss of farmland	68
4.4	OPERATIONAL PHASE SOCIAL IMPACTS.....	69
4.4.1	Improve energy security and support the renewable energy sector.....	69
4.4.2	Creation of employment opportunities	71
4.4.3	Generate income for affected landowners.....	72
4.4.4	Benefits associated with the socio-economic development contributions	73
4.4.5	Visual impact and impact on sense of place	74
4.4.6	Potential impact on property values	75
4.4.7	Potential impact on tourism	76
4.5	ASSESSMENT OF DECOMMISSIONING PHASE.....	77
4.6	CUMULATIVE IMPACT ON SENSE OF PLACE	78
4.7	CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION.....	79
4.8	CUMULATIVE IMPACT ON LOCAL ECONOMY.....	80
4.9	ASSESSMENT OF NO-DEVELOPMENT OPTION	81
	SECTION 5: SUMMARY OF KEY FINDINGS.....	83
5.1	INTRODUCTION.....	83
5.2	SUMMARY OF KEY FINDINGS	83
5.2.1	Policy and planning issues	83
5.2.2	Construction phase impacts	83
5.2.3	Operational phase impacts.....	85
5.2.4	Assessment of cumulative impacts.....	85
5.2.5	Decommissioning phase	86
5.2.6	Assessment of no-development option.....	86
5.3	CONCLUSION AND RECOMMENDATIONS.....	86
	ANNEXURE A	87
	ANNEXURE B: ASSESSMENT METHODOLOGY	88
	ANNEXURE C: CV	90
	ANNEXURE D: DECLARATION OF INDEPENDENCE	91

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 Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1 Annexure D
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1 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;	N/A to SIA
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1 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
(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;	Section 1
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1
(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 and 5
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4 and 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	
(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
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	Section 1, Annexure A
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	
(q) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Comply with the Assessment Protocols that were published on 20 March 2020, in Government

	Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. As at May 2024, there are no sensitivity layers on the Screening Tool for Socio-economic-features. Part A has therefore not been compiled for this assessment.
--	--

ACRONYMS

BESS	Battery Energy Storage System
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
EIA	Environmental Impact Assessment
EM	Emthanjeni Municipality
HD	Historically Disadvantaged
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
MW	Megawatt
NC	Northern Cape
NCPPGDS	Northern Cape Province Provincial Growth and Development Strategy
NCSDF	Northern Cape Spatial Development Framework
SEF	Solar Energy Facility
PGDS	Provincial Growth and Development Strategy
PKSDM	Pixley Ka Seme District Municipality
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SIA	Social Impact Assessment

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

SES Environmental was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Roode Kraal Solar PV1 Solar Energy Facility (SEF) with a capacity of up to 405 MW located approximately 16 km east southeast of the town of De Aar in the Northern Cape Province (Figure 1.1). The project site is situated within the Emthanjeni Municipality (EM), which is located within the Pixley Ka Seme District Municipality (PKSDM). Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

The Roode Kraal Solar PV1 SEF forms one of four PV SEFs that make up the Hercules PV SEF Cluster. Separate EIAs are being undertaken for other three PV SEFs.

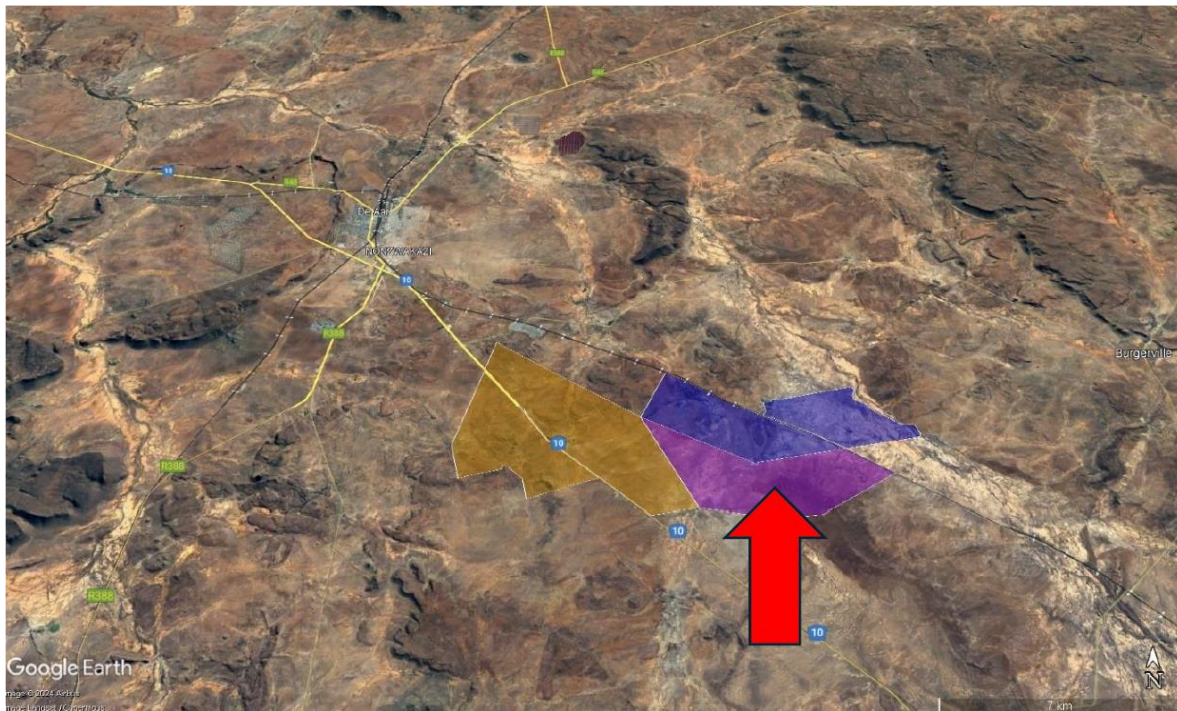


Figure 1.1: Location of Roode Kraal PV1 SEF site (red arrow)

1.2 TERMS OF REFERENCE AND APPROACH

The terms reference and approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007 and IAIA Guidance for Assessing and Managing Social Impacts (2015).

The terms of reference for the SIA require:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed facility.
- A description and assessment of the potential social issues associated with the proposed facility.

- Identification of enhancement and mitigation aimed at maximising opportunities and avoiding and or reducing negative impacts.

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.
- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects.
- Site visit and interviews with key stakeholders.
- Identifying the key potential social issues associated with the proposed project.
- Assessing the significance of social impacts associated with the proposed project.
- Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

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

The proposed Jupiter Solar PV1 is located on a portion of the Remainder of the Farm Roode Kraal No. 28, with the access road located on the Farm 150, and will have an extent of 1 120 ha and will have a development footprint of 680 ha. The proposed development will be located on a property currently zoned as Agriculture and will be used for commercial purposes as the electricity will contribute to the National Electricity Grid. The technical details are described below.

Solar Array

- The solar array will be fragmented into three (3) different areas. The solar array has been split due to the sensitivities provided by the various specialists, as well as the existing infrastructure (Eskom/Transnet/SANRAL) transecting the site. The proposed development will have a maximum output capacity of up to 405 MW, with a solar array with an extent of up to 609.59 ha.
- The solar array will be comprised of solar PV modules with single axis tracking technology with a maximum height of 5m. The Solar module mounting structures will be comprised of galvanised steel and aluminium, whereas the foundations will be drilled and concreted into the ground.
- The solar array will be equipped with solar measurement instruments and weather stations,

IPP Substation and control room

The IPP Substation will have a capacity of up to 132 kV and will be equipped with the High Voltage (HV) transformer, a metering system, filters, capacitors, an inverter and a protection building. The IPP Substation will also be equipped with the substation control building and the MW collector switchgear building. The Substation will have a total footprint of up to 1 ha (100 m x 100 m).

Laydown area

The allocated laydown area of proposed development will have a total footprint of up to 16 ha and will be directly adjacent to the Operational & Maintenance Building and Diesel Storage Area. The Laydown area will be 320 m in width and 500 m in length

Operational & Maintenance Building and Control Buildings

The O&M and control buildings of the project will be the area allocated toward the daily operations of the proposed development and will provide an area where adequate spare part supplies are required to be stored on-site. This includes fuses, mounting structure pieces, junction boxes, cabling components, communication equipment, modules, spare inverters, spare motors and sensors. The area of the O&M Buildings and Control Rooms will have a total footprint of up to 1 ha (100 m x 100 m).

Medium Voltage (MV) Stations and internal reticulation (MV Cables)

The proposed development will include a total number of up to fifty-five (55) medium voltage station (22/33kV) and will be connected via an integrate network of MV underground cables (as per the updated layout). Each MV station will be equipped with an inverter and a transformer. Associated with the locations of the MV Stations will be the DC coupled BESS containers distributed throughout the PV field which will be located adjacent to the inverters.

Internal Roads

The internal roads will have an operational footprint of up to 6 m in width. According to the proposed development layout, the internal roads will intersect the sensitive areas in one location: Watercourse and the associated buffer: In a Western portion of the proposed development, the internal road (and MV cable) will cross a watercourse and its associated buffer for a distance of approximately 113 m (equating to a disturbance footprint of approximately 1 069 m²). The internal roads will connect the various components of the solar array, the medium voltage stations and the main infrastructural components (Substations, the BESS, Laydown areas, etc).

External/Access Road

Access will be obtained through a road leading from the N10-Highway to the proposed development area. The access road will be approximately 10 m in width during the construction phase of the proposed development and will be approximately 8 m in width during the operational phase of the project. The total length of the access road will be approximately 3 703 m (3.7 km). No watercourses will be intersected for the purpose of establishing the access road for the proposed development. The access road will be placed through two of Eskom's transmission corridors (which have been excluded from the development footprint of the Solar Array itself).

The access road will intersect a tributary of the delineated watercourses located towards the south of the proposed development. The impact on the watercourse and its associated buffer will extend for approximately 154 m (equating to a disturbance footprint of approximately 1 540 m²).

Battery Energy Storage System

The Battery Energy Storage System (BESS) will be an AC couple facility located at the substation and laydown area. The facility will be equipped with Solid State Battery Technology (which will be either Lithium-ion or Sodium Sulphide (NaS)). The BESS will be further geared with Battery Cells, Modules, Roacks, containers, a Battery Management System, an Energy Management System and Fire protection systems. The BESS will have an extent of up to 16 ha and will be approximately 220 m in width and 500 m in length. The nearest watercourse to the BESS site is approximately 145 m toward the North-West of the facility.

Diesel Storage area

The proposed layout includes an area allocated towards the storage of hazardous substances (diesel) on site. The area is approximately 2 500m² in size and will be 50 m

in length and width, respectively. The nearest watercourse to the proposed diesel storage area is approximately 528 m North-West of the proposed storage area. It is anticipated that no more than approximately 80 m³ diesel will be stored on site. However, the exact anticipated volumes are not currently known.

Guard house

It is anticipated that one guardhouse will be constructed for the proposed development and will be located along the main access road leading from the N10-Highway to the Substations, laydown areas, and BESS (the fenced area of the proposed development).

Transmission infrastructure²

The Eskom Switching Station (SS) will be proposed adjacent to the proposed IPP Substation) and include:

- An 132kV Overhead Power Line leading from the proposed Eskom Switching Station to the future Kestral Main Transmission Station (MTS) (previously referred to as the Wag 'n Bietjie MTS approved through DFFE Ref: 14/12/16/3/3/1/2577/4).
- A 132kV feeder bay will be constructed at the MTS and the 400kV Busbar at the MTS will be extended.
- The proposed development will also see to the installation of a new 400/132kV transformer and bay at the MTS.



Photograph 1.1: Typical PV SEF facility

² The transmission line infrastructure form part of a separate Environmental Authorisation process.



Photograph 1.2: Example of BESS located in storage containers

1.4 ASSUMPTIONS AND LIMITATIONS

1.4.1 Assumptions

Technical suitability

It is assumed that the development site represents a technically suitable site for the establishment of the proposed PV SEF and associated infrastructure.

Strategic importance of the project

The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Fit with planning and policy requirements

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

1.4.2 Limitations

Demographic data

Ward level data from the 2022 Census was not available at the time of preparing the report. These limitations do not have a material bearing on the findings of the SIA.

1.5 SPECIALIST DETAILS

Tony Barbour, the lead author of this report, is an independent specialist with 30 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 300 SIAs and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Annexure C contains a copy of Tony Barbour's CV.

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

1.6 DECLARATION OF INDEPENDENCE

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

1.7 REPORT STUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction
- Section 2: Summary of key policy and planning documents
- Section 3: Overview of the study area
- Section 4: Identification of key social issues
- Section 5: Summary of key findings.

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

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

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed:

- National Energy Act (2008).
- White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2019).
- National Infrastructure Plan (NIP) (2012 and 2021).
- National Development Plan (2011).
- Astronomy Geographic Advantage Act (Act No 21 of 2007).
- Northern Cape Provincial Growth and Development Strategy (2004-2014).
- Northern Cape Climate Change Response Strategy.
- Northern Cape Spatial Development Framework (2012).
- Northern Cape Province Green Document (2017/2018).
- Pixley ka Seme District Municipality Integrated Development Plan (2022-2027).
- Pixley ka Seme District Municipality Spatial Development Framework (2017).
- Emathanjani Local Municipality Integrated Development Plan (2022-2027).

The section also provides a review of the renewable energy sector in South Africa.

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 National Energy Act (Act No 34 of 2008)

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

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

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

2.2.2 White Paper on the Energy Policy of the Republic of South Africa

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

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

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

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

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

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

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

2.2.3 White Paper on Renewable Energy

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

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol⁴, Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

⁴ The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

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

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

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

2.2.4 Integrated Resource Plan (2019)

South Africa's National Development Plan (NDP) 2030 offers a long-term plan for the country. It defines a desired destination where inequality and unemployment are reduced, and poverty is eliminated so that all South Africans can attain a decent standard of living. Electricity is one of the core elements of a decent standard of living. In formulating its vision for the energy sector, the NDP took as a point of departure the Integrated Resource Plan (IRP) 2010–2030 promulgated in March 2011. The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment (minimize negative emissions and water usage).

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

The IRP notes that South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. The energy sector contributes close to 80% towards the country's total Green House Gas (GHG) emissions of which 50% are from electricity generation and liquid fuel production alone. A transmission from a fossil fuel-based energy sources is therefore critical to reducing GHG emissions. In September 2021 South Africa released its latest emission targets, indicating that it intended to limit Green House Gas (GHG) emissions to 398-510 MrCo2e by 2025, and 350-420 MrCo2e by 2030. These emissions are significantly lower than 2016 emission targets and will see South Africa's emissions decline in absolute terms from 2025, a decade earlier than planned (World Resource Institute, 2021).

The IRP (2019) notes that 39 730 MW of new generation capacity must be developed. Of the 39 730 MW determined, about 18 000 MW has been committed to date. This new capacity is made up of 6 422 MW under the REIPPP with a total of 3 876 MW operational on the grid. Under the Eskom build programme, the following capacity has been commissioned: 1 332MW of Ingula pumped storage, 1 588MW of Medupi, 800MW of Kusile and 100MW of Sere Wind Farm. In addition, IPPs have commissioned 1

005MW from two Open Cycle Gas Turbine (OCGT) peaking plants.1 005 MW from OCGT for peaking has also been commissioned (IRP 2019, page 14).

In terms of IRP (2019) provision has been made for the following new additional capacity by 2030:

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

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

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

Installed Capacity

Committed/Already Contracted Capacity

Capacity Decommissioned

New Additional Capacity

Extension of Koeberg Plant Design Life

Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 2.1: Summary of energy allocations and commitments based on the 2019 IRP

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

In terms of renewable energy five bidding rounds have been completed for renewable energy projects under the RE IPP Procurement Programme. The most dominant

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

2.2.5 National Development Plan

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

2.2.6 The New Growth Path Framework

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

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

2.2.7 National Infrastructure Plan

Government adopted a National Infrastructure Plan (NIP) in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. The aim of the NIP is support 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 included three energy SIPs, namely SIP 8, 9 and 10.

- SIP 8: Green energy in support of the South African economy.
- SIP 9: Electricity generation to support socio-economic development.
- SIP 10: Electricity transmission and distribution for all.

The NIP 2050 was gazetted for public comment on 10 August 2021⁵. The first phase of the NIP 2050 focuses on four critical network sectors that provide a platform, namely, energy, freight transport, water, and digital infrastructure. In line with the NDP, the vision for the energy sector is to promote:

- Economic growth and development through adequate investment in energy infrastructure” (generation, transmission, and distribution) and reliable and efficient energy service at competitive rates, while supporting economic growth through job creation by stimulating supply chains.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution, reduce water usage and mitigate the effects of climate change.

The NIP 2050 notes that by 2030, the NDP set a target that more than 90% of the population should enjoy access to grid connected or off-grid electricity by 2030. To realise this vision, South Africa's energy system will be supported by effective policies, institutions, governance systems, regulation and, where appropriate, competitive markets. In terms of energy mix, NIP 2050 notes that coal will contribute significantly less to primary-energy needs in the future, while gas will have an important enabling role, energy supply will be **increasingly dominated by renewable energy resources– especially wind and solar which are least cost and where South Africa has a comparative advantage.**

NIP 2050 also notes that South Africa is signatory of the Paris Agreement which aims to achieve Net Zero greenhouse gas emissions by 2050. To achieve this will require a shift to a least cost energy path that is increasingly reliant on renewables. For South Africa this is imperative for the following reasons:

- SA cannot afford to overspend while dramatically expanding capacity.
- Renewables can be built quickly and in modular form thereby avoiding many of the challenges associated with mega projects.
- Trade partners are expected to increasingly impose border carbon taxes harming SA exports.
- SA will need to commit to emission reductions as a global citizen.

2.2.8 Astronomy Geographic Advantage Act

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

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (NCPGDS) identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly

⁵ Gazette No. 44951

from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include:

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

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

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

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

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

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

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

In this regard, care will need to be taken to ensure that the proposed development and associated renewable energy facilities do not negatively impact on the region's natural environment. In this regard, the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the provinces exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa.

2.3.2 Northern Cape Provincial Spatial Development Framework

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

- Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government.
- Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development.
- Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism.
- Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism).

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

- Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts.
- 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).

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

- The construction of telecommunication infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible.
- EIAs undertaken for such construction must assess the impacts of such activities against the directives listed in (a) above.
- Renewable energy sources such as wind, solar, thermal, biomass and domestic hydroelectricity are to constitute 25% of the province's energy generation capacity by 2020.
 - The following key policy principles for renewable energy apply.
 - Full cost accounting: Pricing policies will be based on an assessment of the full economic, social and environmental costs and benefits of energy production and utilisation.

- Equity: There should be equitable access to basic services to meet human needs and ensure human well-being. Each generation has a duty to avoid impairing the ability of future generations to ensure their own well-being.
- Global and international cooperation and responsibilities: Government recognises its shared responsibility for global and regional issues and act with due regard to the principles contained in relevant policies and applicable regional and international agreements.
- Allocation of functions: Government will allocate functions within the framework of the Constitution to competent institutions and spheres of government that can most effectively achieve the objectives of the energy policy.
- The implementation of sustainable renewable energy is to be promoted through appropriate financial and fiscal instruments.
- An effective legislative system to promote the implementation of renewable energy is to be developed, implemented, and continuously improved.
- Public awareness of the benefits and opportunities of renewable energy must be promoted.
- The development of renewable energy systems is to be harnessed as a mechanism for economic development throughout the province in accordance with the Sustainable Development Initiative (SDI) approach (refer to Toolkit D10) or any comparable approach.
- Renewable energy must, first, and foremost, be used to address the needs of the province before being exported.

2.2.3 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key Sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, is identified as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC also indicated that the NCP was involved in the processing a number of WEF and Solar Energy Facility EIA applications.

2.2.4 Northern Cape Province Green Document

The NCP Green Document (2017-2018) was prepared by the Northern Cape Department of Economic Development and Tourism and provides an impact assessment of IPPs on the communities in the province located within a 50 km radius from existing facilities. The document notes that the NCP is nationally a leader in commercial-scale renewable energy projects. By 2018 a total of 23 IPP projects in the province had been integrated into the national grid. These projects include Solar PV,

Concentrated Solar and WEFs. The document notes that through their economic development obligations these projects have already made a significant positive contribution to affected communities. Much of the effort has been directed at supporting local education. The document also notes that, as these projects are committed to 20-year minimum lifespans, the collectively hold a tremendous potential for socio-economic upliftment.

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

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

2.3.4 Pixley ka Seme District Municipality Integrated Development Plan

The vision for the Pixley ka Seme District Municipality (PKSDM) is "Sustainably Developed District for future Generations". The mission statement that underpins the vision is:

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

The IDP lists nine strategic objectives (SOs), namely:

- SO1: To enhance Compliance with the tenets of good governance as prescribed by legislation and best practice.
- SO2: To Administer finances in a sustainable manner and strive to comply with legislative requirements to achieve a clean audit outcome.
- SO3: To Monitor and support local municipalities to enhance service delivery.
- SO4: To promote economic growth in the district.
- SO5: To Guide local municipalities in the development of their IDP's and in spatial development.
- SO6: To provide a professional, people- centred human resources and administrative service to citizens, staff and Council.
- SO7: To provide an independent and objective internal audit assurance and consulting service to add value and to improve the administrative operations of all the municipalities in the district through an approach that is systematic and disciplined.
- SO8: To provide disaster management services to the citizens.

- SO9: To provide municipal health services to improve the quality of life of the citizens.

SO4 and 9 are relevant to the development.

The IDP notes that there are eight Urban Centres that function as the administrative centres for each of the eight municipalities in the district. The urban centres are:

- De Aar (Emthanjeni Municipality).
- Colesberg (Umsobomvu Municipality).
- Victoria West (Ubuntu Municipality).
- Hopetown (Thembelihle Municipality).
- Carnarvon (Kareeberg Municipality).
- Prieska (Siyathemba Municipality).
- Douglas (Siyancuma Municipality).
- Petrusville (Renosterberg Municipality).

There are also a number of smaller satellite towns within the district, namely:

- Britstown.
- Hanover.
- Phillipstown.
- Strydenberg.
- Richmond.
- Vanderkloof.

The IDP highlights the importance of the area's natural resources and environment, noting that the conservation of the unique Karoo landscape and fauna and flora is important to maintain the environmental quality and resources in the Pixley Ka Seme District. The importance of agriculture is also noted. The key challenges facing the district include high unemployment and poverty rates. Climate change and the availability of water is also identified as a key challenge.

The IDP lists the strengths, opportunities, and aspirations for each of local municipality located within the PKSDM. The relevant municipality for the project is the Emthanjeni Local Municipality. Of relevance, solar energy is identified as a key opportunity.

Strengths

- Strategic Spatial location and transport network along the N1 and N10, linking to major cities.
- The De Aar Railway line linkage to major cities
- Farming value chain.
- Natural radiation for alternative energy.
- Strategic location for renewable energy.

Opportunities

- Renewable energy value chain.
- Farming.
- Tourism.
- Youth development and technical skilling for renewable energy
- Recycling non-operational solar panels.
- Fixing of faulty solar panels.
- Renewable energy value chain

Aspirations

- Renewable energy technical centre with solar education.
- Solar component manufacturer supplying the global market.
- Link railway line with renewable energy.
- Emthanjeni to become first city to utilise renewable energy for own consumption.
- Training electrical engineers in TVET College.
- World class agricultural processing facility.
- SMME support service for enterprise development.
- Development of infrastructure to attract tourists.
- Productive use of available land.
- Up-skill unemployed youth.

In summary, the IDP highlights the opportunities for expanding the role played by the renewable energy sector in the district municipality, including the establishment of solar parks and opportunities for the production and manufacturing of components for solar farms. Agri-processing and eco-tourism are also highlighted as opportunities.

The barriers and constraints to development include:

- Availability of supporting transport infrastructure.
- Availability of water.
- Electricity costs and supply.

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

2.3.5 Pixley ka Seme District Municipality Spatial Development Framework

The PKSDM Spatial Development Framework (SDF) notes that the development vision for the district is "Pixley Ka Seme DM, pioneers of development, a home and future for all!!!" The spatial vision for the PKSDM is "*An exciting mix of*":

- Cultural wilderness, floristic, river and coastal tourism.
- Mining and mining beneficiation.
- Agriculture including intensive irrigation and dry land farming, livestock grazing and game.

The SDF notes that the districts topography is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances. This asset makes for excellent scenic drives throughout the whole of the region from the flat plains to crossing the main rivers of South Africa. Of relevance that SDF notes that the ridges and escarpment have significant potential in terms of aesthetic or visual appeal as well as habitat for rare and endangered plants and animals.

Section 2.2.8, Minerals, and energy resources, highlights the renewable energy potential of the district. The section also notes that a concern for the renewable development in the area is the capacity of Eskom's transmission network and ability for new renewable energy generation projects to connect in the near future. The SDF notes that substantial upstream network strengthening will be required to facilitate new generation capacity.

The SDF also highlights the importance of the tourism sector. In this regard the district is home to the central Karoo which is characterized by desolate valleys between flat tops hills. The district contributes towards the Northern Cape Karoo Skies and Culture

and Oasis Tourism clusters. As indicated in Figure 2.2, the road between De Aar and Britstown is designated as a local tourist route (green).

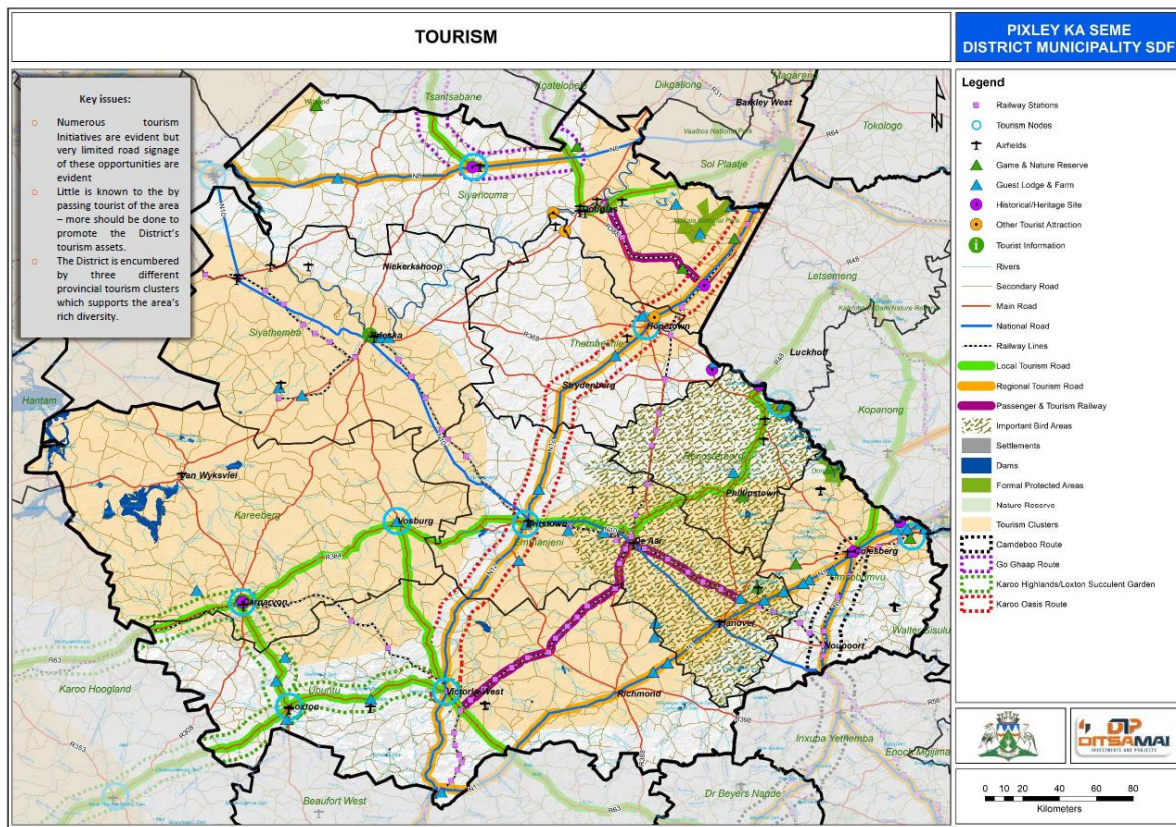


Figure 2.2: Pixley Ka Seme DM-Tourism

The SDF highlights the risks posed by climate change, noting that the Karoo could experience more drought periods, coupled with increased evaporation and temperatures and this will negatively impact already restricted water supply. The SDF identifies several key issues that are relevant to the development, including:

- The potential impact of climate change.
- An area is known for clean air and open skies with limited light pollution.
- An area is known to have a high Solar Index to support renewable energy.
- Wind in the area can also support future wind farms.

Chapter 3 outlines the spatial proposals for the PKSDM. Section 3.3.2, Protect and manage biodiversity, water, and agricultural resources, is relevant to the development and recognises the role of natural and cultural assets in ecosystem functioning, ecosystem goods and services, the local, district and regional economy, and the unique livelihood of Pixley Ka Seme District's residents. The objectives and principles that are relevant include:

Objectives

- A sustainable renewable energy sector that promotes a green economy.
- To protect and conserve high potential agricultural land.
- To develop existing and new tourism attraction sites.

Principles

- Protect high potential agricultural land.
- Encourage a shift from carbon-dependent development.
- Optimise the utilisation of natural environmental resources for tourism development.
- Enhance and respect nature.

Section 3.3.2.5.2, Environmental protection, and tourism development zone, discusses the opportunities associated with tourism in the district. The SDF notes that together with agriculture and agri-processing, tourism is a sector of the economy that can significantly assist in achieving future growth and development in the region and playing a significant part in uplifting the poor out of poverty. The guidelines for the development of tourism in this zone that are relevant to the development include:

- Support tourism and other nature-based development.
- Allow for renewable energy infrastructure development with special conditions that need to make provision for visual impact, noise pollution, and other considerations that would safeguard the natural environment.

Eco-tourism is identified as the most suitable form of tourism in rural areas. The advantages of eco-tourism include:

- Eco-tourism projects are more likely to be sustainable because the natural environment is protected.
- Eco-tourism projects are on a smaller scale than other forms of tourism which makes it easier for rural communities to participate.

Section 3.3, Competitive infrastructure development, addresses infrastructure development in the district. Of relevance the objectives include promoting off-grid development and making use of renewable energy. The development of renewable energy projects in proximity of existing electrical substations is listed as an opportunity for the district. As indicated in Figure 2,3, a large number of Eskom transmission lines cut across the EM.

Section, 3.3.3.5.1, Renewable energy development zone, notes that the district is blessed with significant solar and wind energy and that these assets should be leveraged to encourage Independent Power Producers to locate in the region. The SDF also notes that large areas of the district that are located outside of REDZs have the potential to generate renewable energy. This includes the study area.

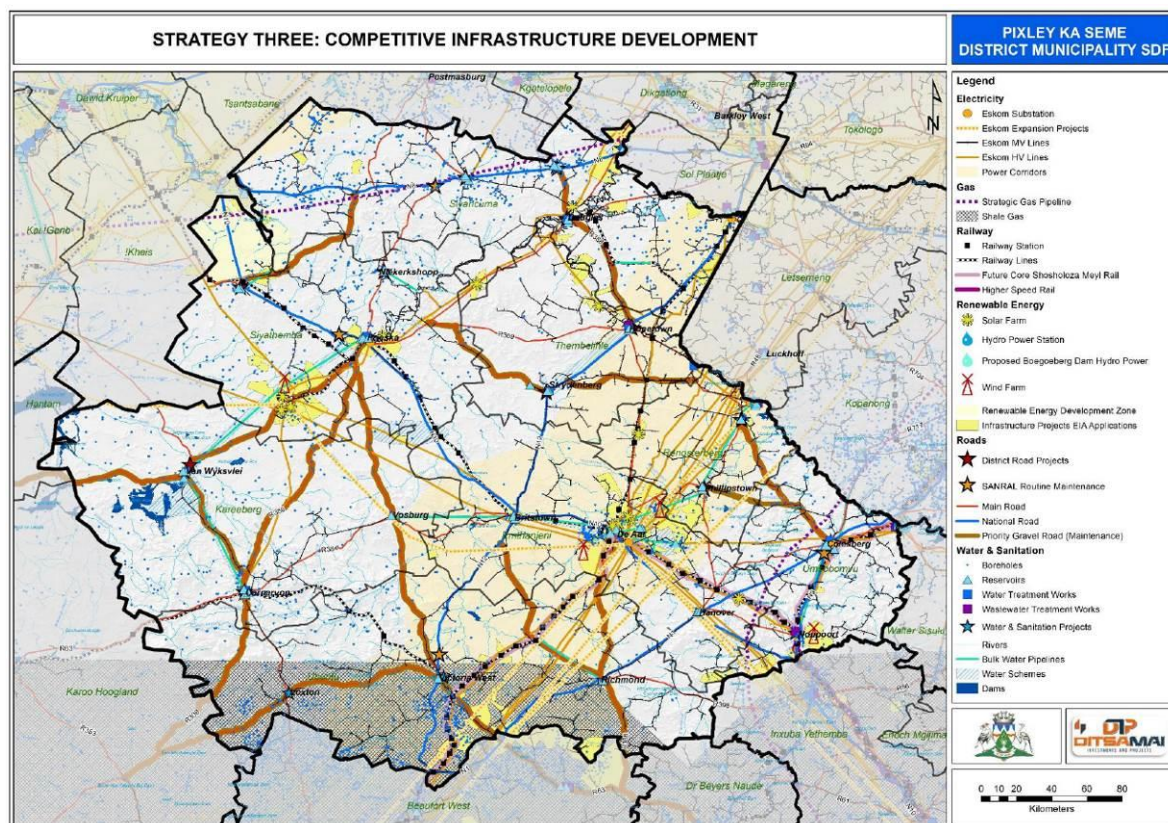


Figure 2.3: Pixley Ka Seme DM-Infrastructure Development

The SDF is informed by a set of Spatial Planning Categories (SPCs) that provide a framework to guide decision-making regarding land-use. The SPCs are listed in Figure 2.4. Of relevance to the study area are SPC C, Agriculture Areas, and SPC F, Surface Infrastructure, which includes power lines and renewable energy facilities. As indicated in Figure 2.5, the study area appears to be largely located within a SPC C and F area.



Figure 2.4: Spatial Planning Categories

Of relevance, land uses supported in SPC C, Agriculture Areas, include energy-related infrastructure. The relevant guidelines for SPC C, Agriculture Areas, include:

- Where possible installations should be located on previously disturbed terrain, or land of low biodiversity or agricultural value and should not interfere with, or impact negatively on, existing or planned production areas as well as agricultural infrastructure.
- Installations should include appropriate buffers, and landscaping and screening to reduce their visual impact on the rural landscape.

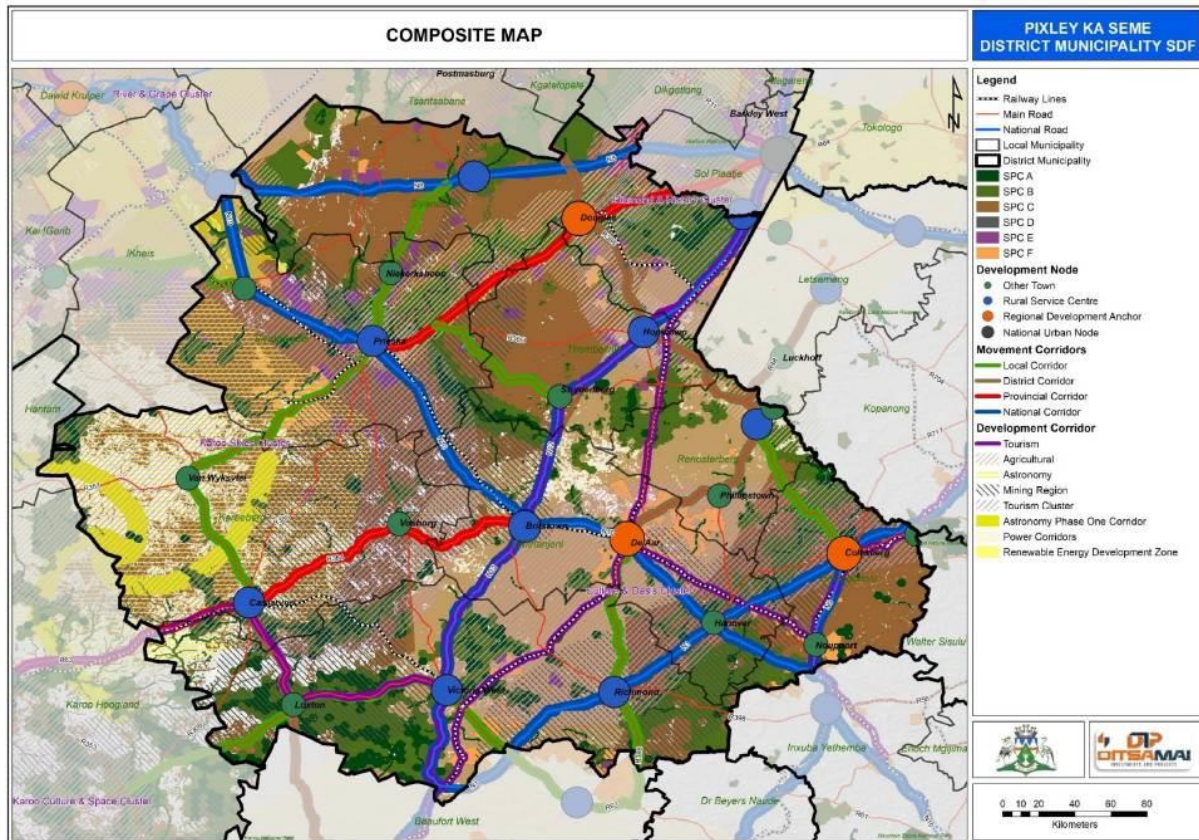


Figure 2.5: Pixley Ka Seme DM-Composite Map and location of SPCs

The SDF also provides an overview of each of the eight local municipalities located within the PKSDM, including the EM.

Emthanjeni Municipality

The EM is the economic hub of the district and hosts the key regional socio-economic facilities. Of relevance the SDF notes that in terms of infrastructure development, the development of renewable energy initiatives close of Eskom Substations should be supported. The importance of the tourism and agriculture sectors is also noted.

The SDF also notes that in terms of socio-economic infrastructure, educational levels in the EM are low. In terms of opportunities, the SDF recommends that the curriculum at the TVET college in De-Aar should be expanded to support skills required in the Renewable Energy, Logistics, and Agricultural Sectors. The development of an Industrial / Manufacturing Park in De Aar is also recommended. This could be linked to the renewable energy sector.

2.3.6 Emthanjeni Local Municipality Integrated Development Plan

The Emthanjeni Municipality (EM) is a category B municipality consisting of three towns, namely, De Aar, Britstown and Hanover. The Vision of the EM is "A centre for development and service excellence focused on economic development in pursuit of a better life for all".

The mission statement that underpins the vision is "To provide a quality service at all times and:

- Value our resources both human and financial.
- Develop an active citizenry.
- Create a conducive environment for economic growth".

The IDP lists 7 key performance areas (KPAs), namely:

- KPA1: Basic Services & Infrastructure Development.
- KPA2: Financial Viability.
- KPA3: Good Governance and Public Participation.
- KPA4: Institutional Development and Municipal Transformation.
- KPA5: Local Economic Development.
- KPA6: Safety and Security.
- KPA7: Social Development.

KPA 5 and 7 are relevant to the development. Under KPA 5, the IDP notes that 8 Renewable Energy projects (Solar and Wind) have been established in the EM. A SWOT analysis was undertaken as part of the IDP. The relevant findings are summarised below.

Weaknesses

- Limited resources to adequately address infrastructure development & maintenance of infrastructure.

Opportunities

- SMME development.
- Skills development opportunities (hospital and solar projects).
- Investment opportunities in De Aar.

Threats

- Lack of skills in the community.
- Unemployment and poverty.
- Lack of environmental management.

The IDP identifies several potential opportunities that are relevant to the development, including:

- Renewable Energy/ Tourism Hub.
- De Aar Logistic & Storage Hub.
- Renewable Energy opportunities.
- Advantage of National corridors (N1, N10, N12).
- Washing of Solar PV Panels, Grass Cutting and maintenance, manufacturing of material locally.

The challenges facing the municipality include:

- Electricity supply interruptions due to lack of maintenance, vandalism, aging infrastructure, and load shedding.
- Ageing infrastructure e.g., electricity and water network.
- Electricity supply for economic development projects.

Climate change is identified a key challenge. The impacts are linked to increasing temperatures, increasing rainfall variability, increasing periods of drought and increasing storms and flooding events. The IDP notes that the Karoo could experience more drought periods, couple with increased evaporation and temperatures having negative impacts on already restricted water supply. The increase in temperature will require the municipality to either find alternative sources of water supply or to increase boreholes. Energy consumption will also potentially increase by 10% and a similar strategy for alternative energy will have to be identified for both cooling in summer and heat in winter. The IDP notes that solar energy will be needed to relieve electricity and the municipality will need to use SMME programmes more effectively for the installation and maintenance of solar energy to address the challenges of climate change.

Of specific relevance the IDP identifies the EM area as Renewable Energy Hub and highlights the potential opportunities. The IDP notes that renewable energy sector investments during 2010-15 grew the local economy from 1.4 to 6% due a boom in the construction of the solar energy farms. However, the IDP also identifies potential constraints, including:

- Lack of business skills in small enterprises hampers use of economic development obligations funding opportunities from the IPPS
- Low literacy levels of the local communities exclude them from participating in SED-ED opportunities.
- Low pace of socio-economic transformation (economic landscape and its exclusivist approach to ownership and distribution of income and wealth).
- Lack of Government support to ensure that equipment manufacturers are located in South Africa.

The IDP also comments on the potential risks, including that once the construction phase of renewable energy wind and solar parks is complete, municipalities can be left with dilapidating infrastructure and the socioeconomic implications of the short-term economic boom during the construction phase.

The IDP also highlights the importance of the agricultural and tourism sectors. Agriculture forms the backbone of EM economy and accounts for the largest labour/employment contributor to date. The Manufacturing sector shows potential of growth through the introduction of Renewable energy projects in De Aar and surrounding areas. Tourism is linked to the area's natural assets, including game farming and hunting. The IDP also indicates that the development of the renewable energy sector also creates an opportunity to develop tourism packages that include tours of the renewable energy plants as well as providing information on the background and functioning of these plants.

2.4 OVERVIEW RENEWABLE ENERGY SECTOR IN SOUTH AFRICA

The section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa. Given that South Africa supports the development of renewable energy at national level, the intention is not to provide a

critical review of renewable energy. The focus is therefore on the contribution of renewable energy, specifically in terms of supporting economic development.

The following documents were reviewed:

- Independent Power Producers Procurement Programme (IPPPP): An Overview (December 2021), Department of Energy, National Treasury and DBSA.
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS.
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.
- WWF SA, Renewable Energy Vision 2030, South Africa, 2014.
- Jacqueline M. Borel-Saladin, Ivan N. Turok, (2013). The impact of the green economy on jobs in South Africa), South African Journal of Science, *Volume 109 /Number 9/10, September/October 2013*.
- The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town.

2.4.1 Independent Power Producers Procurement Programme (IPPPP): An Overview

The document presents an overview of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) undertaken by the Department of Energy, National Treasury, and the Development Bank of South Africa in December 2021. The programme's primary mandate is to secure electrical energy from the private sector for renewable and non-renewable energy sources. With regard to renewables, the programme is designed to reduce the country's reliance on fossil fuels, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The IPPPP has been designed not only to procure energy but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership.

The Integrated Resource Plan for electricity (IRP) provides South Africa's long-term plan for electricity generation. It primarily aims to ensure security of electricity supply, minimise the cost of that supply, limit water usage and reduce greenhouse gas (GHG) emissions, while allowing for policy adjustment in support of broader socio-economic developmental imperatives. The IRP 2019 was promulgated in October 2019 and replaced the IRP 2010 as the country's official electricity infrastructure plan.

It calls for 37 696MW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies as ageing coal plants are decommissioned and the country transitions to a larger share of renewable energy. By 2030, the electricity generation mix is set to comprise of 33 364MW (42.6%) coal, 17 742MW (22.7%) wind, 8 288MW (10.6%) solar photovoltaic (PV), 6 830MW (8.7%) gas or diesel, 5 000MW (6.4%) energy storage, 4 600MW (5.9%) hydro, 1 860MW (2.4%) nuclear and 600MW (0.8%) concentrating solar power (CSP). Additionally, a short-term gap at least 2000MW is to be filled between 2019 and 2022, thereby further raising new capacity requirements, while distributed or embedded generation for own-use is positioned to add 4 000MW between 2023 and 2030. The IRP is intended to be frequently updated, which could impact future capacity allocations from various energy sources and technologies.

Energy supply

By the end of December 2021, the REIPPPP had made the following significant impacts.

- 6 323 MW of electricity had been procured from 92 RE Independent Power Producers (IPPs) in BW1-4.
- 5 661 MW of electricity generation capacity from 85 IPP projects has been connected to the national grid.
- 71 073GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013.

Renewable energy IPPs have proved to be very reliable. Of the 85 projects that have reached COD, 77 projects have been operational for longer than a year. The energy generated over the past 12-month period for these 77 projects is 14 117GWh, which is 95% of their annual energy contribution projections (P50) of 14 924GWh over a 12-month delivery period. Thirty-one (31) of the 77 projects (40%) have individually exceeded their P50 projections.

Comparatively, the following statistics were presented at the REIPPPP Bid Window 6 Bidders Conference on 7 July 2022 by the IPP Office based on data as of March 2022 following seven bid rounds (IPP Office, 2022⁶):

- 92 IPPs have been selected as preferred bidders.
- 6 323 MW of electricity capacity procured.
- 5 826 MW already operational from 87 IPPs.
- 74 805 GWh energy generated by Renewable Energy sources.

Energy costs

In line with international experience, the price of renewable energy is increasingly cost competitive when compared with conventional power sources. The REIPPPP has effectively captured this global downward trend with prices decreasing in every bid window. Energy procured by the REIPPPP is progressively more cost effective and has approached a point where the wholesale pricing for new coal-and renewable-generated energy intersect.

Through the competitive bidding process, the IPPPP effectively leveraged rapid, global technology developments and price trends, buying clean energy at lower and lower rates with every bid cycle, resulting in SA getting the benefit of renewable energy at some of the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.94/kWh, while solar PV has dropped with 75% to R1.14/kWh between BW1 and BW4.

Prices contracted under the REIPPPP for all technologies are well below the published REFIT prices. The REIPPPP has effectively translated policy and planning into delivery of clean energy at very competitive prices with the BW4 price directly comparable with the per kWh price of new coal generation. Solar PV has dropped most significantly with a price decrease of 75% to R1.10/kWh between BW1 and BW4. As such it is contributing to the national aspirations of secure, affordable energy, lower carbon intensity and a transformed 'green' economy. This compares with the industry estimates in April 2020 of R1.45/kWh for Medupi. Considering the on-going delays incompletion, indications are that these costs may even be significantly higher.

⁶ IPP Office (2022). RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME (REIPPPP) BID WINDOW 6 BIDDERS' CONFERENCE, 7 JULY 2022 [online]. Accessed July 2022. <https://www.ipp-renewables.co.za/PressCentre/GetPressRelease?fileid=16a21004-f9fd-ec11-9578-2c59e59ac9cd&fileName=BW6%20Bidders%20Conference%20Consolidated.pdf>.

Investment

The document notes that the REIPPPP has attracted significant investment in the development of the REIPPs into the country. The total investment (total project costs⁷), including interest during construction, of projects under construction and projects in the process of closure is R209.6 billion (this includes total debt and equity of R209 billion, as well as early revenue and VAT facility of R0.5 billion).

The REIPPPP has attracted R42 billion in foreign investment and financing in the seven bid windows (BW1 – BW4). This is almost double the inward FDI attracted into South Africa during 2015 (R22.6 billion). The document notes that the share of foreign investment and equity showed an increase in the most recent bid window (2S2), suggesting that the REIPPPP continued to generate investor confidence despite the poor economic conditions in South Africa in recent years.

Comparatively, based on the information presented at the REIPPPP Bid Window 6 Bidders Conference on 7 July 2022 by the IPP Office (IPP Office, 2022), approximately R209.6 billion investment has been attracted for energy infrastructure in all bid windows; and as at March 2022 an actual R1.9 billion contribution was realised for socio-economic development.

South African citizen shareholding

The importance of retaining local shareholding in IPPs is key condition of the procurement requirements. The RFP notes that bidders are required to have South African Equity Participation of 40% in order to be evaluated. South African (local) equity shareholding across BW1-4 equates to 52% (R31.4 billion) of the total equity shareholding (R61.0 billion) was held by South African's across BW1 to BW4, 1S2 and 2S2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R29.6 billion and contributes 49% of total equity.

The REIPPPP also contributes to Broad Based Black Economic Empowerment (BBBEE) and the creation of black industrialists. In this regard, Black South Africans own, on average, 34% of projects that have reached financial close (BW1-BW4), which is 4% higher than the 30% target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.

On average, black local communities own 9% of projects that have reached financial close. This is well above the 5% target. In addition, an average of 21% shareholding by black people in engineering, procurement, and construction (EPC) contractors has been attained for projects that have reached financial closure. This is higher than 20% target. The shareholding by black people in operating companies of IPPs has averaged 30% (against the targeted 20%) for the 85 projects in operation (i.e. in BW1-4).

The target for shareholding by black people in top management has been set at 40%, with an average 68% achieved to date. The target has therefore been significantly exceeded.

Community shareholding and community trusts

The regulations require a minimum ownership of 2.5% by local communities in IPP projects as a procurement condition. This is to ensure that a substantial portion of the investments has been structured and secured as local community equity. An individual

⁷ Total project costs means the total capital expenditure to be incurred up to the commercial operations date in the design, construction, development, installation, and or commissioning of the project)

community's dividends earned will depend on the terms of each transaction corresponding with the relevant equity share. To date all shareholding for local communities have been structured through the establishment of community trusts. For projects in BW1 to BW4, qualifying communities will receive R25.5 billion net income over the life of the projects (20 years). The report notes that the bulk of the money will however only start flowing into the communities from 2028 due to repayment obligations in the preceding years (repayment obligations are mostly to development funding institutions). However, despite the delay this represents a significant injection of capital into mainly rural areas of South Africa. If the net projected income for the first seven bid windows (BW1-BW4) was structured as equal payments overtime, it would represent an annual net income of R1.27 billion per year.

Income to all shareholders only commences with operation of the facility. Revenue generated to date by the 85 operational IPPs amounts to R149.9 billion.

Procurement spend

In addition to the financial investments into the economy and favourable equity structures aimed at supporting BEE, the REIPPPP also targets broader economic and socio-economic investment. This is through procurement spend and local content.

The total projected procurement spend for BW1 to BW4 during the construction phase was R71.1 billion, while the projected operations procurement spend over the 20 years operational life is estimated at 75.2 billion. The combined (construction and operations) procurement value is projected as R146.3 billion of which R92.1 billion has been spent to date. For construction, of the R71.1 billion already spent to date, R71 billion is from the 85 projects which have already been completed. These 85 projects had planned to spend R64.2 billion. The actual procurement construction costs have therefore exceeded the planned costs by 11% for completed projects.

Preferential procurement

The share of procurement that is sourced from Broad Based Black Economic Empowered (BBBEE) suppliers, Qualifying Small Enterprises (QSE), Exempted Micro Enterprises (EME) and women owned vendors are tracked against commitments and targeted percentages. The IA target requirement for BBBEE is 60% of total procurement spend. However, the actual share of procurement spend by IPPs from BBBEE suppliers for construction and operations combined is currently reported as 83%, which is significantly higher than the target of 60%, but also the 71% that had been committed by IPPs. BBBEE, as a share of procurement spend for projects in construction, is also reported as 84% with operations slightly lower at 74%.

The majority of the procurement spend to date has been for construction purposes. Of the R76 billion spent on procurement during construction, R64.3 billion has reportedly been procured from BBBEE suppliers, achieving 84.6% of total procured. Actual BBBEE spend during construction for BW1 and BW2 alone was R25.5 billion, 81% more than the 14.1 billion planned by the IPPs. The R64.3 billion spent on BBBEE during construction is 30% more than the R49.7 billion that had originally been anticipated by all IPPs procured in BW1-4.

Total procurement spend by IPPs from QSE and EMEs has amounted to R28.1 billion (construction and operations) to date, which exceeds commitments by 250% and is 30% of total procurement spend to date (while the required target is 10%). QSE and EME's procurement spend for construction was 31% of construction procurement to date and 26% of operational procurement, exceeding the 10% targets set. QSE and EME share of construction procurement spend totals R23.8 billion, which is 5.4 times the planned spend for construction of R4.4 billion during this procurement phase.

In terms of procurement from women-owned vendors to date, 5% of total construction procurement spend has been from woman-owned vendors (against a targeted 5%), and 6% of operational procurement spend has been realised from woman-owned vendors to date, thereby exceeding the targeted 5%. In terms of construction spend, R 4.1 billion was undertaken by women-owned vendors, which is almost double the R 1.8 billion expected to be spent for the construction of projects that have reached financial close. The REIPPPP has therefore created significant employment opportunities for black South African citizens and local communities beyond planned targets. This highlights the importance of the programme in terms of employment equity and the creation of more equal societies.

Local Content⁸

The report notes that the REIPPPP programme represents the country's most comprehensive strategy to date in achieving the transition to a greener economy. Local content minimum thresholds and targets were set higher for each subsequent bid window. The report notes that for a programme of this magnitude, with construction procurement spend alone estimated at R71.1 billion, the result is a substantial stimulus for establishing local manufacturing capacity. The local content strategy has created the required incentives for a number of international technology and component manufactures to establish local manufacturing facilities.

The documents notes that for the portfolio as a whole, the expectation would reasonably be for local content spend to fall between 25% and 65% of the total project value (considering the range of targets and minimum requirements). Local content commitments by IPPs amount to R66.3 billion or 45% of total project value (R148.2 billion for all bid windows).

Actual local content spend reported for IPPs that have started construction amounts to R63.3 billion against a corresponding project value (as realised to date) of R127.2 billion. This means that 50% of the project value has been locally procured, exceeding the 45% commitment from IPPs and the thresholds for BW1 – BW4 (25-45%).

To date, the R63.3 billion local content spend reported by active IPPs is already 96% of the R66 billion local content expected. This is with 6 projects still in construction, and 85 of the 91 active projects having reached COD (i.e. 93% of the active portfolio complete). For the 85 projects that have reached COD, local content spend has been R 58.72 billion of a committed R58.67 billion, which is 0.1 more than the planned local spend.

Leveraging employment opportunities

To date, a total of 63 291 job years⁹ have been created for South African citizens, of which 48 110 job years were in construction and 15 182 in operations. These job years should rise further past the planned target as more projects enter the construction phase. Employment opportunities across BW1-4 are 143% of the planned number during the construction phase (i.e. 33 707 job years), with 6 projects still in construction and employing people. The number of employment opportunities is therefore likely to continue to grow beyond the original expectations.

⁸ Local content is expressed as a % of the total project value and not procurement or total project costs.

⁹ The equivalent of a full-time employment opportunity for one person for one year

By the end of December 2021, 85 projects had successfully completed construction and moved into operation. These projects created 44 172 job years of employment, compared to the anticipated 30 488. This was 45% more than planned.

The report notes that employment thresholds and targets were consistently exceeded across the entire portfolio. The average share of South African citizens of total South Africa based employees for BW1 – BW4 was 91% during construction (against a target of 80%), while it was 96% during operations for BW1 – BW4 (against a target of 80%). The report notes that the construction phase offers a high number of opportunities over shorter durations, while the operations phase requires fewer people, but over an extended operating period.

To date, 48 110 job years for SA citizens were achieved during construction, which is 43% above the planned 33 707 job years for active projects. These job years are expected to rise further since 6 projects are still in construction.

In terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. For active projects, the expectation for local community participation was 13 284 job years. To date 25 272 job years have been realised (i.e. 90% more than initially planned), with 6 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 74%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 44% and 48% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (85%) has significantly exceeded the 50% target and the 30% minimum threshold. Likewise, the share of skilled black citizens (as a percentage of skilled employees) for both construction (71%) and operations (82%) has also exceeded the 30% target and minimum threshold of 18%. The share of local community members as a share of SA-based employees was 48% and 70% for construction and operations respectively – significantly exceeding the minimum threshold of 12% and the target of 20%.

Socio-economic development (SED) contributions

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

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2%, which is 101% higher than the minimum threshold level. To date (across BW1-4) a total contribution of R22.8

billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

As a percentage of revenue, SED obligations become effective only when operations commence, and revenue is generated. Of the 91 IPPs that have reached financial close (BW1–BW4), 85 are operational. The SED contributions associated with these 85 projects has amounted to R 1.8 billion to date.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. SED spend on education has been almost double the expenditure on enterprise development. This is despite enterprise development being a stand-alone commitment category in terms of the IA. This is, in part, due to the fact that some early childhood development programmes have also been incorporated in educational programmes. IPPs have supported 1 388 education institutions with a total of R437 million in contributions, from 2015 to the end of June 2021. A total of 1 276 bursaries, amounting to R210.8 million, have been awarded by 67 IPPs from 2015 until the end of June 2021. The largest portion of the bursaries were awarded to African and Coloured students (97.4%), with women and girls receiving 56.3% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 57.2%, followed by the Eastern Cape (20.2%) and Western Cape (14.1%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

Enterprise development contributions

The target for IPPs to spend on enterprise development is 0.6% of revenues over the 20- year project operational life. However, for the current portfolio, IPPs have committed an average of 0.63% or 0.03% more than the target. Enterprise development contributions committed for BW1-4, amount to R7.2 billion. Assuming an equal distribution of revenue over the 20-year project operational life, enterprise development contributions would be R358 million per annum. Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development.

Of the total commitment, R5.6 billion is specifically committed directly within the local communities where the IPPs operate, contributing significantly to local enterprise development. A total contribution of R504.1 million has already been made to the local communities (i.e. 94% of the total R537.9 million enterprise development contributions made to date).

Contribution to cleaner energy and water savings

As part of the global commitment, South Africa is targeting an emissions trajectory that peaks at 34% below a “business as usual” case in 2020, 42% below in 2025 and from 2035 declines in absolute terms. The REIPPPP contributes constructively to economic stability, energy security and environmental sustainability.

The emission reductions for the programme during the preceding 12 months (June 2019-June 2020) is calculated as 15.1 million tonnes CO₂ (MtonCO₂) based on the 14 835 GWh energy that has been generated and supplied to the grid over this period. This represents 75% of the total projected annual emission reductions (20.5MtonCO₂) achieved with only partial operations. A total of 72.1 Mton CO₂ equivalent reduction has been realised from programme inception to date.

The March 2019 Report also notes that since operation, the IPPs have saved 42.8 million kilolitres of water related to fossil fuel power generation. This saving will have increased with the increase in energy generated by renewable energy since 2019. The REIPPPP therefore contributes significantly towards meeting South Africa's GHG emission targets and, at the same time, supporting energy security, economic stability, and environmental sustainability.

2.4.2 Green Jobs Study

The study notes that South Africa has one of the most carbon-intensive economies in the world, therefore making the greening of the electricity mix a national imperative. Within this context the study notes that the green economy could be an extremely important trigger and lever for enhancing a country's growth potential and redirecting its development trajectory in the 21st century. The attractiveness of wind and solar technologies is not only supported by local conditions, but also by the relatively mature stage of their technological development.

The aim of the Green Jobs study was to provide information on the net direct job creation anticipated to emerge in the formal economy across a wide range of technologies/activities that may be classified as green or contributing to the greening of the economy. The study looked at the employment potential for a number of green sectors, including power generation, over three consecutive timeframes, namely, the short term (2011 – 12), medium term (2013 – 17) and long term (2018 – 25). The analysis attempts to estimate the employment potential associated with: building, construction and installation activities; operations and maintenance services; as well as the possible localisation spin-offs for the manufacturing sector as the domestic production of equipment, parts and components benefits from preferential local procurement.

It is also worth noting that the study only considered direct jobs in the formal economy. Multiplier effects were not taken into account. As a result, the analysis only captures a portion of the potential employment impact of a greening economy. International studies have indicated that there are considerable backward and forward linkages through various value chains of production, as well as of indirect and induced employment effects. The employment figures can therefore be regarded as conservative. The analysis reveals the potential of an unfolding green economy to lead to the creation of approximately 98 000 new direct jobs, on average, in the short term, almost 255 000 in the medium term and around 462 000 employment opportunities in the formal economy in the long term. The number of jobs linked to the power generation was estimated to be ~ 12 500 in the short term, 57 500 in the medium term and 130 000 in the long term. Power generation jobs therefore account for 28% of the employment opportunities created in the long term. However, the report notes that the contribution made by a progressively expanding green energy generation segment increases from 14% of the total in the short term, or just over 13 500 jobs, to more than 28% in the long term (166 400) (Table 2.1). The study also found that energy generation is expected to become an increasingly important contributor to green job creation over time, as projects are constructed or commissioned.

Table 2.1: Net direct employment potential estimated for the four broad types of activity and their respective segments in the long term, and an indication of the roll-out over the three timeframes

Broad green economy category		Segment	Technology/product	Total net direct employment potential in the long-term	Net direct manufacturing employment potential in the long-term	Total net direct employment potential (ST, MT, LT)	Net direct manufacturing employment potential (ST, MT, LT)
ENERGY GENERATION	Renewable (non-fuel) electricity	Wind power	Onshore wind power	5 156	2 105	VL, L, M	L, M, H
			Offshore wind power				
		Solar power	Concentrated solar power	3 014	608	N, VL, M	N, VL, M
			Photovoltaic power	13 541	8 463	M, H, H	H, VH, VH
		Marine power	Marine power	197	0	N, N, VL	N, N, N
		Hydro power	Large hydro power	272	111	VL, VL, VL	VL, M, VL
			Micro-/small-hydro power	100	0	VL, VL, VL	N, N, N
	Fuel-based renewable electricity	Waste-to-energy	Landfills	1 178	180	VL, VL, L	VL, VL, L
			Biomass combustion	37 270	154	VL, H, VH	VL, VL, L
			Anaerobic digestion	1 429	591	VL, VL, L	VL, L, M
			Pyrolysis/Gasification	4 348	2 663	VL, L, M	VL, H, H
			Co-generation	10 789	1 050	L, M, H	M, H, H
	Liquid fuel	Bio-fuels	Bio-ethanol	52 729	6 641	M, H, VH	L, H, VH
			Bio-diesel				
ENERGY GENERATION SUB-TOTAL				130 023	22 566		
ENERGY & RESOURCE EFFICIENCY		Green buildings	Insulation, lighting, windows	7 340	838	L, M, M	L, M, M
			Solar water heaters	17 621	1 225	L, H, H	L, M, H
			Rain water harvesting	1 275	181	VL, VL, L	VL, VL, L
		Transportation	Bus Rapid Transport	41 641	350	VH, VH, VH	H, M, L
		Industrial	Energy efficient motors	-566	4	VL, VL, VL	VL, VL, VL
			Mechanical insulation	666	89	VL, VL, VL	VL, VL, VL
ENERGY & RESOURCE EFFICIENCY SUB-TOTAL				67 977	2 686		
EMMISSIONS AND POLLUTION MITIGATION		Pollution control	Air pollution control	900	166	N, VL, VL	N, L, L
			Electrical vehicles	11 428	10 642	VL, L, H	N, H, VH
			Clean stoves	2 783	973	VL, VL, L	VL, L, M
			Acid mine water treatment	361	0	VL, VL, VL	N, N, N
		Carbon Capture and Storage		251	0	N, VL, VL	N, N, N
		Recycling		15 918	9 016	M, H, H	H, VH, VH
EMMISSIONS AND POLLUTION MITIGATION SUB-TOTAL				31 641	20 797		
NATURAL RESOURCE MANAGEMENT		Biodiversity conservation & eco-system restoration		121 553	0	H, VH, VH	N, N, N
		Soil & land management		111 373	0	VH, VH, VH	N, N, N
NATURAL RESOURCE MANAGEMENT SUB-TOTAL				232 926	0		
TOTAL				462 567	46 049		

(Source: Green Jobs Study, 2011)

Notes:

- VH = very high (total employment potential > 20 000 direct jobs; manufacturing employment potential > 3 000 direct jobs);
- H = high (total employment potential > 8 000 but < 20 000; manufacturing employment potential > 1 000 but < 3 000);
- M = medium (total employment potential > 3 000 but < 8 000; manufacturing employment potential > 500 but < 1 000);
- L = low (total employment potential > 1 000 but < 3 000; manufacturing employment potential > 150 but < 500);
- VL = very low (total employment potential > 0 but < 1 000; manufacturing employment potential > 0 but < 150);

- N = negligible/none (total employment potential = 0; manufacturing employment potential = 0).

Of relevance the study also notes that the largest gains are likely to be associated with operations and maintenance (O&M) activities, particularly those involved in the various natural resource management initiatives. In this regard, operations and maintenance employment linked to renewable energy generation plants will also be substantial in the longer term. The employment growth momentum related to building, construction and installation activities peaks in the medium term, largely propelled by mass transportation infrastructure, stabilising thereafter as green building methods become progressively entrenched.

In addition, as projects related to a greening economy are progressively commissioned, the potential for local manufacturing also become increasingly viable. Employment gains in manufacturing are also expected to be relatively more stable than construction activities, since the sector should continue exhibiting growth potential as new and replacement components are produced, as additional markets are penetrated and as new green technologies are introduced. Manufacturing segments with high employment potential in the long term would include suppliers of components for wind and solar farms. The study does note that a shortage of skills in certain professional fields pertinent to renewable energy generation presents a challenge that must be overcome.

The study also identifies a number of advantages associated with renewable energy with a large 'technical' generation potential. In this regard, renewable energy, such as solar and wind, does not emit carbon dioxide (CO₂) in generating electricity and is associated with exceptionally low lifecycle emissions. The construction period for renewable energy projects are much shorter than those of conventional power stations, while an income stream may, in certain instances, be provided to local communities through employment and land rental. The study also notes that the greenhouse gases (GHG) associated with the construction phase are offset within a short period of time compared with the project's lifespan. Renewable power therefore provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa, renewable energy source is not dependent on water (as compared to the massive water requirements of conventional power stations), has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.

Of relevance, the study also notes that renewable energy projects in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

2.4.3 Powering the Future: Renewable Energy Roll-out in South Africa

The study notes that South Africa has higher CO₂ emissions per GDPppp (2002 figures) from energy and cement production than China or the USA (Letete, T et al). Energy accounts for 83% of the total GHG emissions (excluding land use, land use change and forestry) with fuel combustion in the energy industry accounting for 65% of the energy emissions of South Africa (DEA, 2011).

Within a broader context of climate change, coal energy does not only have environmental impacts, it also has socio-economic impacts. Acid mine drainage from abandoned mines in South Africa impacts on water quality and poses the biggest threat to the country's limited water resources. Huge volumes of water are also

required to wash coal and cool operating power stations. Eskom uses an estimated 10 000 litres of water per second due to its dependency on coal (Greenpeace, 2012).

The report notes that the concerns relating to whether South Africa can afford renewable energy arise out of the perception that renewable energy (RE) is expensive while fossil and nuclear technologies are cheap. The premise also ignores life cycle costing of the technologies which is favourable to renewable technologies where the sources of fuel are free or cheap.

2.4.4 WWF SA Renewable Energy Vision 2030

In its vision the WWF motivated for a more ambitious plan, suggesting that the IRP should provide for an 11-19% share of electricity capacity by 2030, depending on the country's growth rate over the next fifteen years. The vision is to increase renewable energy at the expense of new coal-fired and nuclear capacity. The report notes that in addition to the obvious environmental benefits of this scenario, it will enable South Africa to add flexibility to energy supply capacity on an on-demand basis.

The report notes that Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) introduced in 2011, has by all accounts been highly successful in quickly and efficiently delivering clean energy to the grid. Increasingly competitive bidding rounds have led to substantial price reductions. In this regard, the study indicates that in three years, wind and solar PV have reached pricing parity with supply from new coal-fired power stations from a levelised cost of electricity (LCOE) perspective.

In bidding window 3 of August 2013, the average tariffs bid for wind and solar PV were R0,66/kWh and R0.88/kWh respectively, well below the recent estimates of R1.05/kWh for supply from the coal-fired Medupi and Kusile power stations (Papapetrou 2014).

The report also notes that the REIPPPP has several contracting rounds for new renewables supply. A robust procurement process, extension of a 20-year sovereign guarantee on the power purchase agreement (PPA) and, especially, ideal solar power conditions, have driven the investment case for RE in South Africa. In this regard, South Africa has been identified as one of the worlds' leading clean energy investment destinations (Figure 2.4).

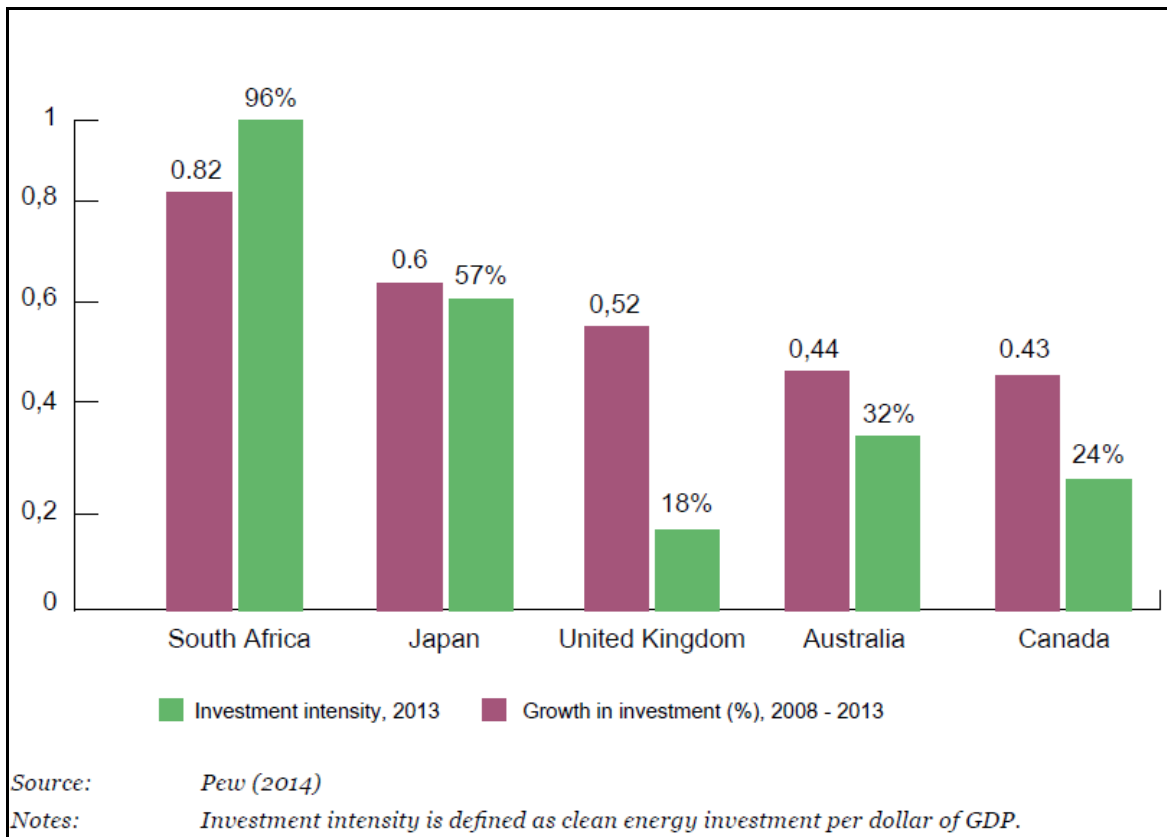


Figure 2.4: South Africa leads as a clean energy investment destination

With regard to local economic development, the REIPPPP sets out various local economic development requirements with stipulated minimum threshold and aspirational targeted levels, which each bidder must comply with. Based on the Broad-Based Black Economic Empowerment Codes, this requirement comprises the following components which make up a scorecard:

- Ownership by black people and local communities.
- Job creation.
- Local content.
- Management control.
- Preferential procurement.
- Enterprise development.
- Socio-economic development.

The final award is based on a combined evaluation in which price determines 70% of the ranking and performance on the local economic development scorecard the remaining 30%. This gives non-price criteria a much heavier weighting than they would normally enjoy under Government's preferential procurement policy.

Job creation, local content and preferential procurement accounted for the bulk of possible points on the scorecard in REIPPPP Round 3. Consequently, a requirement to source goods and services locally is considered to be the central driver of project costs associated with local economic development. In terms of local content, the definition of local content is quite broad, being the value of sales less the costs associated with imports. However, through successive bidding rounds, the definition has become subject to more detailed definition, with an expanding list of exclusions and increased

targeting in terms of key components identified by the Department of Trade and Industry for local manufacturing. This has benefitted local manufacturers and suppliers.

The WWF study considers a low and high growth renewable energy scenario. The capital requirements for the low growth scenario are estimated at R474 billion over the period 2014-2030 (2014 Rand value), rising to R1.084 trillion in the high-growth scenario, in which 35 GW of capacity is built. Each annual round of purchasing 2 200 MW of RE capacity would cost approximately R77 billion in 2014 Rand value terms. In relative economic terms, this equates to 2% of the GDP per annum or approximately one quarter of Government's planned annual investment in infrastructure over the medium term. In the low economic growth scenario, which is arguably the more realistic one, the average annual new liability over the period is approximately R40 billion.

The study also points out that infrastructure spend is more beneficial than other government expenditure due to the infrastructure multiplier effect. This refers to the beneficial impact of infrastructure on economic growth in both the short term, resulting from expansion in aggregate demand, as well as in the longer term (six to eight years) due to enhanced productive capacity in the economy. A recent USA study on highway expenditure revealed the infrastructure multiplier to be a factor of two on average, and greater during economic downturns (Leduc & Wilson 2013). This means that one dollar spent on infrastructure raises GDP by two dollars. If the same were to hold true, as similar analysis suggests it would (Kumo 2012, Ngandu et al 2010), this indicates that the construction of renewable energy plants could be a valuable economic growth driver at a time when fears of recession abound.

The report concludes that the WWF is optimistic that South Africa can achieve a much more promising clean energy future than current plans allow for. With an excellent solar resource and several good wind-producing pockets, the country is an ideal candidate for a renewable energy revolution.

The report indicates that the levelised cost of producing renewable energy already competes favourably with the three main alternatives, namely coal, gas and nuclear. In addition, renewable energy would contribute to a more climate-resilient future and insulate South Africa from dependence on expensive and unreliable fuel sources priced in dollars. Critical from a planning perspective, the report notes that renewable energy can also provide added flexibility on an 'as needed' basis, as electricity demand grows. This is vital in a highly uncertain environment.

2.4.5 The impact of the green economy on jobs in South Africa

The paper notes that greening the economy is particularly important in South Africa for two basic reasons: (1) the exceptional level of unemployment that the country is experiencing and (2) the high carbon impact of the economy.

In terms of employment, the paper refers to the IDC *Green Jobs Report* (2011). In summary, the short-term (next 2 years) estimate of total net employment potential is 98 000 jobs, and the long-term (next 8 years) employment potential is 462 567 jobs. Natural resource management is predicted to lead to the greatest number of these at 232 926 long-term jobs. Green energy generation is estimated to produce 130 023 long-term jobs, with energy and resource efficiency measures adding another 67 977 long-term jobs.

The paper notes that the Green Jobs Report was prepared by seventeen primary researchers from three prominent organisations, namely the IDC, the Development Bank of South Africa, and Trade and Industrial Policy Strategies. Many role players from other organisations were also consulted, including the World Wide Fund for Nature, the Green Building Council, the Economic Development Department and private companies involved in green industries.

Despite questions surrounding the employment estimates contained in the Green Jobs Report, green economic activity does appear to generate more local jobs than fossil-fuel-based industries. Some of the estimates also indicate the potential for significant employment. The paper concludes that the figures represent a promising starting point that warrants further research and policy involvement in greening the economy in South Africa.

2.4.6 Potential for local community benefits

In her thesis, Tait¹⁰ notes that the distributed nature of renewable energy generation can induce a more geographically dispersed pattern of development. As a result, RE sites can be highly suited to rural locations with otherwise poor potential to attract local inward investment therefore enabling to target particularly vulnerable areas.

In her conclusion, Tait notes that the thesis has found positive evidence for the establishment of community benefit schemes in the wind sector in South Africa. These benefits would also apply to solar projects. The BBBEE requirements for developers as set out in the DoE's IPPPP for renewables is the primary driver for such schemes. The procurement programme, in keeping with the objective of maximising the economic development potential from this new sector, includes a specific focus on local communities in which wind farms are located.

The procurement programme, typical of all Government tendering processes, includes a BBBEE scorecard on which renewable energy projects are evaluated. However, the renewables scorecard appears to play an important part in a renewed focus on the broad-based Aspects of the legislation, as enforced by a recent national review of the BBBEE Act. In this regard, the renewables scorecard includes specifications for local communities in respect of broad-based ownership schemes, socio-economic development and enterprise development contributions. This approach to legislating social responsibilities of business in all sectors definitely has a South African flavour, borne out of the political history of the country and the imperatives for social transformation laid out in the constitution.

While Tait notes that it is still early days for the development of this sector and one cannot determine the impact that such benefit schemes may have, it is clear though that targeted development expenditure will be directed to multiple rural communities and there seems to be a strong potential to deliver socio-economic benefits.

¹⁰ The potential for local community benefits from wind farms in South Africa, Louise Tait (2012), Master's Thesis, Energy Research Centre University of Cape Town. Similar benefits are also likely to be associated with solar energy projects.

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

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

- The administrative context.
- Overview of local municipality.
- Site and the surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Emthanjeni Municipality (EM), which falls within the Pixley ka Seme District Municipality (PKSDM) in the Northern Cape Province (Figure 3.1). The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Renosterberg, Ubuntu, Siyancuma and Umsobomvu municipalities. De Aar is the administrative seat of the EML and PKSDM.

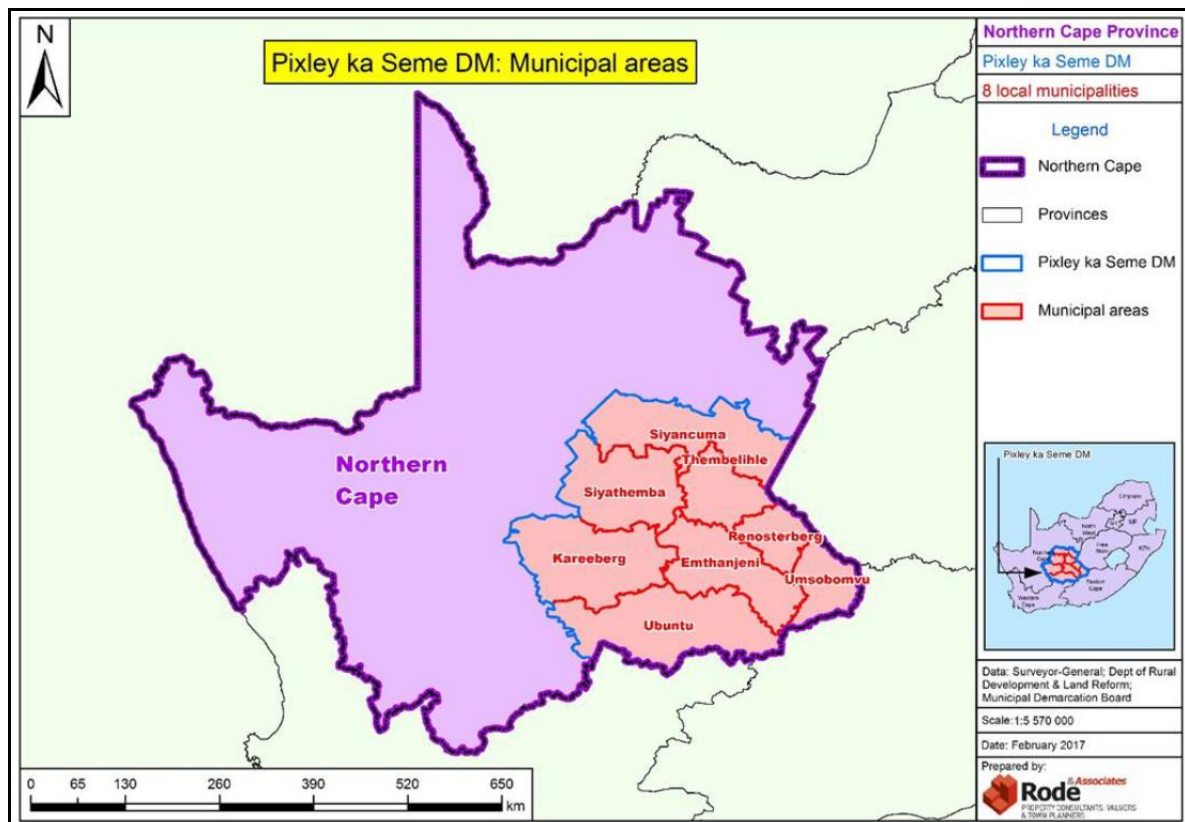


Figure 3.1: Location of the Pixley Ka Seme District Municipality and Emthanjeni Local Municipality and within the Northern Cape Province

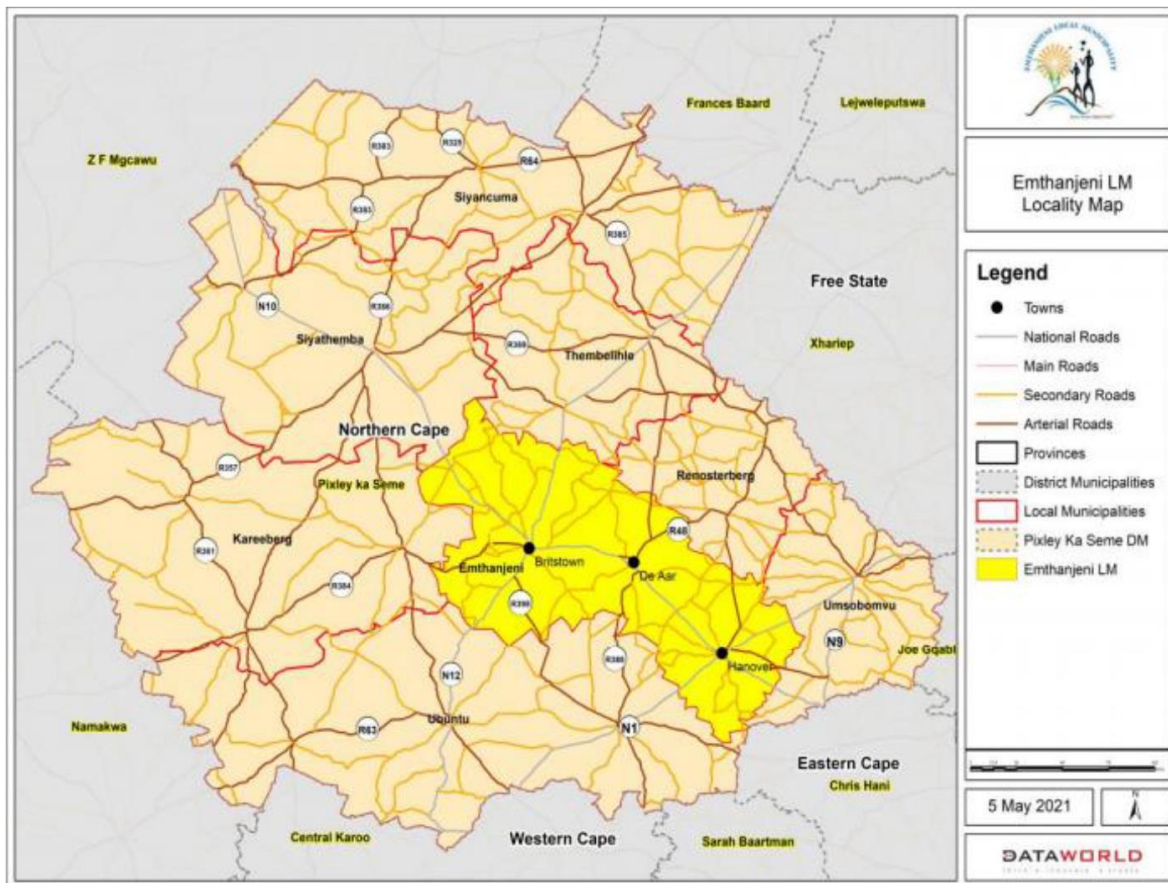


Figure 3.2: Location of Emthanjeni Local Municipality within the Pixley Ka Seme District Municipality

3.3 PROVINCIAL CONTEXT¹¹

The proposed site located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361 830 km² and, constitutes approximately 30% of South Africa. The province is divided into five district municipalities (DM), namely, Frances Baard, Karoo, Namakwa, Pixley Ka Seme and ZF Mgcawu District Municipality (known before 1 July 2013 as Siyanda DM). The site itself is located in the Pixley Ka Seme DM.

Population Based on the 2021 Socio-Economic review the population of the Northern Cape Province was 1.293 million, making it the most sparsely populated province in South Africa. Of this total 50% were Black African, 38% Coloured and 12% White. The figure from the 2022 Census is 1 355 945. In terms of households, the number of households increased from 247 000 in 2002 to 350 000 in 2019, an increase of 103 000.

In terms of district municipalities, the most populated district was Frances Baard 438 901 (32.6%), followed by ZF Mgcawu 284 391 (21.1%), John Taolo Gaetsewe 261 363 (19.4%), Pixley ka Seme 220 842 (16.4%) and Namakwa 139 381 (10.4%). Economically, the Frances Baard contributed 35.6% towards the Northern Cape's GDP, followed by ZF Mgcawu (25.1%), John Taolo Gaetsewe (16.9%), Pixley ka Seme

¹¹ The information in this section is based on the Northern Cape Socio-Economic Profile (2021)

(11.8%) and Namakwa (10.7%). Figure 3.1 illustrates the contributions that the districts made to the province's economy in 2019.

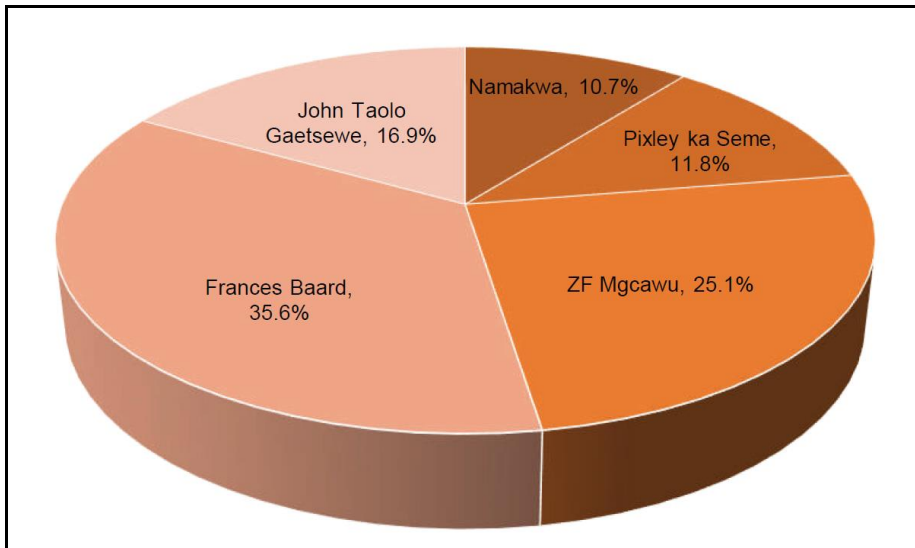


Figure 3.2: Contribution of district municipalities to Northern Cape GDP

In terms of economic sectors, the Tertiary Sector was the largest sector in the Northern Cape, contributing 53.4% towards the provincial GDP 2018. The Primary Sector contributed 26.9% in 2018 while the Secondary sector only contributed 9.8%. In terms of sub-sectors, Mining and quarrying in the Primary sector was the most important sub-sector (20.5%), followed by General government services (16.1%) and Finance, real estate and business services (1.4%) in the Tertiary sector (Table 3.1).

Table 3.1: Provincial Sectoral Growth and Contributions to GDP, 2017 and 2018

Sector	Growth Rate (%)		Contributions to GDP (%)	
	2017	2018	2017	2018
Primary sector	8.1	-0.3	27.3	26.9
Agriculture, forestry and fishing	12.4	-5.9	7.1	6.4
Mining and quarrying	7.1	1.1	20.2	20.5
Secondary sector	-0.4	-0.3	9.2	9.8
Manufacturing	-0.7	0.4	3.1	3.2
Electricity, gas and water	0.2	0.3	3.5	3.9
Construction	-0.9	-1.8	2.7	2.7
Tertiary sector	0.5	0.9	53.7	53.4
Trade, catering and accommodation	-0.8	0.2	10.7	9.5
Transport, storage and communication	0.6	0.7	10.8	10.3
Finance, real estate and business services	1.5	1.2	11.9	12.4
Personal services	1.8	0.8	4.8	5.0
General government services	0.0	1.3	15.5	16.1
All industries at basic prices	3.0	0.3	90.2	90.0
Taxes less subsidies on products	0.9	2.1	9.8	10.0
GDPR at market prices	2.8	0.5	100.0	100.0

In terms of employment per sector, the most important sector was Community and social services (i.e, government sector) which employed 34.3% of the labour force, followed by Trade (14.8%), Finance (12.2%), Mining (10.3%) and Agriculture (9.1%). In terms of employment, the unemployment rate for the Northern Cape increased in Quarter 4 of 2019 from the level in Quarters 3 in 2020 and was also higher than the level in Quarter 4 of 2019 (Figure 3.3). The unemployment rate in Quarter 2 of 2020 was ~ 28%.

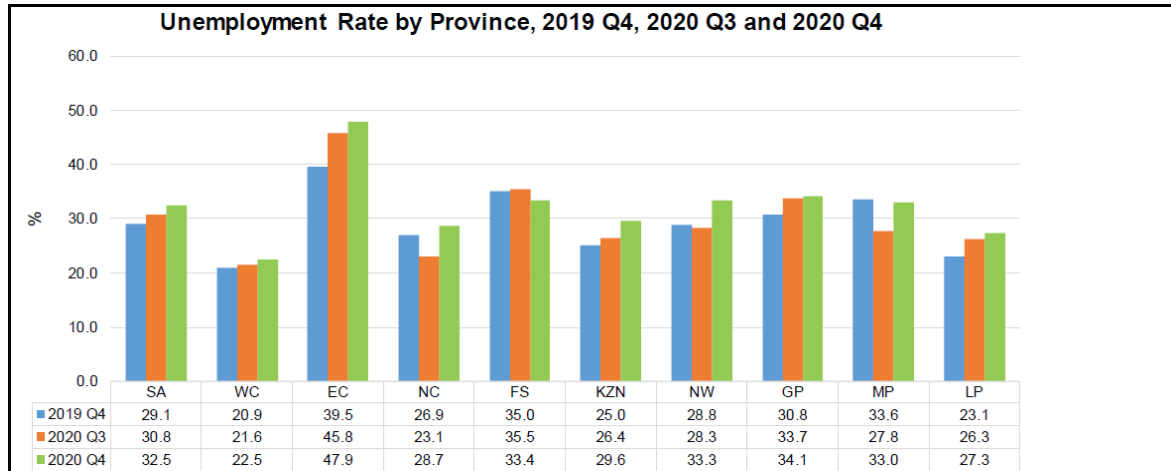


Figure 3.3: Unemployment Rate by Province, 2019 Q4, 2020 Q3 and 2020 Q4

In terms of each of the districts Frances Baard had the highest unemployment rate (33.8%), followed by Pixley ka Seme (33%), John Taolo Gaetsewe (25.8%), Namakwa (22.3) and ZF Mgcawu (20%) (Table 3.2).

Table 3.2: Number Employed, Unemployed and Unemployment Rate per District, 2019

District	2019		
	Employed	Unemployed	Unemployment rate (%)
Namakwa	42 284	12 055	22.3
Pixley ka Seme	50 090	24 538	33.0
ZF Mgcawu	95 031	23 278	20.0
Frances Baard	106 593	53 244	33.8
John Taolo Gaetsewe	56 018	20 665	25.8

In terms of poverty levels, Frances Baard had the highest poverty levels (62.3%), followed by John Taolo Gaetsewe (61.2%), Pixley ka Seme (53.4%), ZF Mgcawu (48.8%) and Namakwa (39.7%). The poverty level in the Northern Cape Province was 55.4%.

Table 3.3: Poverty Indicators by District, 2010 and 2019

District	2010		2019	
	No. of People in Poverty	Percentage of People in Poverty (%)	No. of People in Poverty	Percentage of People in Poverty (%)
Namakwa	48 499	38.7	55 319	39.7
Pixley Ka Seme	99 878	52.3	118 017	53.4
ZF Mgcawu	116 004	47.9	138 775	48.8
Frances Baard	201 309	56.1	273 376	62.3
John Taolo Gaetsewe	126 862	61.2	160 043	61.2
Northern Cape	592 552	52.7	745 530	55.4

3.4 MUNICIPAL OVERVIEW

Population

The population of the EM in 2022 was 46 587, which represents a 10% increase from the 2011 population of 42 356. Of this total, 29.13% were under the age of 15, while 64.79% fell within the economically active age of 15 and 64 years old, and the remaining 6.09% were 65 and older. This distribution is in line with the Provincial population proportions of 27.83%, 65.55%, and 6.62% respectively. Based on this information the dependency ratio for the EM in 2022 was 54%. The higher dependency ratio reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality. 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.

In terms of race groups in 2022, Coloureds made up 59.90% of the Municipality, followed by Black Africans (31.95%), and Whites (7.34%). Additionally, the main home language spoken in the ELM was Afrikaans (69.07%), followed by isiXhosa (25.12%), and English (1.19%). The Provincial home language distribution was also majority Afrikaans speakers (51.40%), followed by Setswana (33.58%), and isiXhosa (4.22%).

Households and house types

Based on the 2022 Census, there were a total of 10 622 households in the EM. Of this total 95.22% resided in formal dwellings compared to the Provincial figure of 85.92%. 4.32% of EM households resided in informal dwellings, which is significantly lower than the Provincial figure of 12.15%.

Based on the 2022 Census data 49.07% of households within the ELM were headed by females, compared to 39.8% in 2016. This represents a significant increase over a 6 year period and reflects the lack on formal employment and economic opportunities in the EM. As a result, job seekers from the ELM need to leave the areas to seek work in the larger centres. The majority of the job seekers are likely to be males. This is due to traditional rural patriarchal societies where the role of the women is usually linked to maintaining the house and raising the children, while the men tend to be the ones that migrate to other areas in search of employment. Female headed households tend to be more vulnerable so socio-economic shocks.

Household income¹²

Based on the data from the 2011 Census, 9.1% of the population of the EM had no formal income, 3.3% earned less than R 4 800, 4.9% earned between R 5 000 and R 10 000 per annum, 18.2% between R 10 000 and R 20 000 per annum and 22.4% between R 20 000 and 40 000 per annum (2011). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 57.9% of the households in the EM live close to or below the poverty line. While this figure is lower than the provincial level of 62.9%, the low-income levels reflect the limited employment opportunities in the area and dependence on the agricultural sector. This is also reflected in the high unemployment rates. As indicated above, this highlights the importance to maximising local employment opportunities and the key role played by training and skills development programmes.

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 EM. This in turn impacts on the ability of the EM to maintain and provide services.

The Integrated Development Plan (IDP) for the ELM indicates that the total number of indigent households within the municipal area increased from 2 726 households as of 30 June 2014 to 2 874 as at April 2017 and about 3 594 households during January 2016/17. The COVID-19 pandemic is likely to have resulted in an increase in the number of indigent households in 2020 and 2021.

Employment¹³

The official unemployment figure in 2011 for the ELM was 14.5%. The figures also indicate that the majority of the population are not economically active, namely 43.7%. These figures were similar to the official unemployment rate for the Northern Cape Province (14.5%) and Pixley ka Seme District (14.8%). This reflects the limited employment opportunities in the area, which in turn are reflected in the low income and high poverty levels. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in the MM. South Africa's unemployment rate was 32.1% in Q4 of 2023, while the youth unemployment rate was 43.4% in Q3 2023, the highest recorded youth employment rate in the world.

Education

The percentage of the population over 20 years of age in the EM with no schooling was 5.90% according to the 2022 Census, which was lower than the provincial figure of 6.64%. The proportion of the population in the EM over 20 years old with matric as their highest level of education was 32.48%, while 6.88% had a higher education qualification. These figures were similar to the Provincial figures of 30.72% and 7.09% respectively.

¹² No data on household income was available from Census 2022 at the time of preparing the report.

¹³ No data on unemployment was available from Census 2022 at the time of preparing the report.

3.5 MUNICIPAL SERVICES

Access to Electricity

83.94% of households in the EM in 2022 used electricity from mains for cooking and 0.17% used other sources of electricity (such as generators), and 0.22% had no access to energy for cooking. Additionally, 96.26% of households used electricity from mains for lighting and 0.22% of households used electricity from other sources, and 0.10% had no access to energy for lighting. The Provincial figures were comparatively lower, with 72% of households using electricity from mains for cooking and 92.49% using electricity from mains for lighting.

Access to Water

65.66% of households in the EM in 2022 had access to piped water inside their dwellings in the ELM, and 32.67% had access to piped water inside their yards. These figures were higher than the Provincial numbers of 54.49% and 27.41% respectively. Additionally, 0.52% of households had access to piped water from a community stand, which was lower than the NCP figure of 13.9%. Around 1.14% of households had no access to water in ELM compared to 4.19% of households for the Province as a whole.

Sanitation

Based on Census 2022 97.59% of households in the EM had access to flush toilets, which was significantly higher than the Provincial figure of 73.02%. 1.22% of households had no access to any toilet facilities compared to the provincial figure of 4.53%.

Refuse collection

Based on Census 2022 Census, 95.67% of households had their refuse collected by a local authority or private company in EM, which was significantly higher than the provincial figure of 73.21%. In addition, 0.54% used a communal refuse dump or collection point, 3.92% used their own refuse dump, and 0.24% had no rubbish disposal.

3.6 HEALTH AND COMMUNITY FACILITIES

The PKSDM is served by 3 District Hospitals, 8 Community Health Centres, 28 Primary Health Care Clinics, 4 satellite clinics and 1 mobile clinic, distributed over the district. The ELM has 1 District Hospital and 6 Primary Health Care clinics. There are no community health centres within ELM that provide a 24hour service. A new hospital was built in De Aar and was opened in 2017. The Central Karoo Hospital serves as the referral hospital for the district. Minor operations are performed at the facility. Specialists visit the district on a monthly basis from Kimberley Hospital Complex. In terms of education the ELM has 16 schools of which 13 are no-fee schools. The ELM also has libraries.

3.7 ECONOMIC OVERVIEW

Agriculture

Agriculture is the key economic sector in the PKSDM and ELM. Many of the towns within the district municipal area function mainly as agricultural service centres, with the level of services provided at the centres to a large extent reliable on the intensity of the farming practices in the surrounding area. Despite the largely semi-arid and arid environment in the district, the fertile land that lies alongside the Orange, Vaal and Riet Rivers supports the production of some of the country's finest quality agricultural

products, including grapes and vegetables. The main livestock farming in the region include cattle, sheep, and goat farming. Game breeding has also been identified as one of the opportunities which could be linked with the tourism sector for Game reserves and hunting activities. However, despite the key role played by agriculture there is limited value adding to the farming products within the district and the area is prone to droughts and climate change.

Mining

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

Tourism

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

Renewable energy

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

3.8 OVERVIEW OF STUDY AREA

3.8.1 Introduction

The Roode Kraal PV site is located approximately 16 km¹⁴ south-east of the built edge of the large town of De Aar in the Northern Cape Province (Figure 3.4). The project is the northernmost of 4 PV projects that make up the proposed Hercules PV cluster (4 separate EIA applications). De Aar is the seat of both the Emthanjeni Municipality and Pixley ka Seme District Municipality and serves as regional service centre. No other towns or settlements are in significant proximity to the site. The small town of Hanover is located at the intersection of the N10 and N1 corridors, approximately 42 km south-east of the site. Kimberley (230 km) to the north and Bloemfontein (270 km) to the south are the nearest cities for servicing higher order needs.

¹⁴ All distances linear.

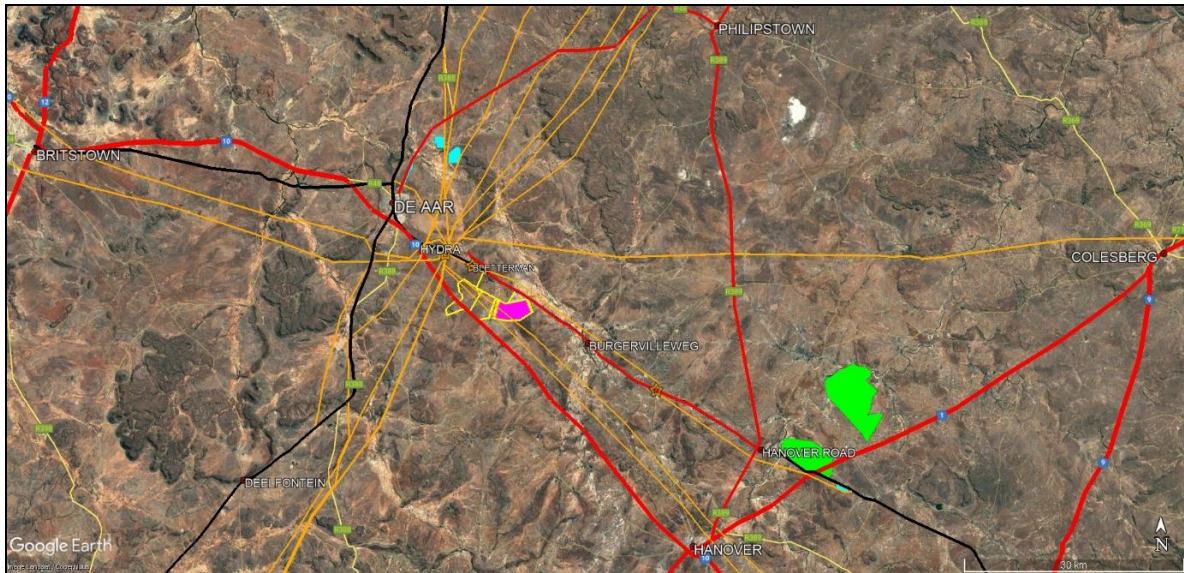


Figure 3.4: Roode Kraal PV site (pink fill) and other Hercules Cluster PV sites (yellow outlines) in context. Also indicated are key roads (red), existing transmission lines (orange), railway lines (black), protected areas (green fill), and operational PV projects (light blue fill)

De Aar is located along the west-east aligned N10, roughly midway between the north-south aligned N12 (Britstown) and N1 (Hannover) corridors. The Roode Kraal PV site is located immediately to the north of the N10 (Photograph 3.1). Site access is proposed directly off the N10. The other key road in the study area is a gravel rail service road off the N10 from near Hydra substation to Hanover Road rail siding. The road runs parallel to the north of the De Aar-Noupoort railway line, closely following the line (Photograph 3.2). All properties in the immediate study area are accessed directly off the N10 or off the Hanover Road gravel road. Access to the Roode Kraal PV site is proposed directly off the N10.

De Aar was established along the Cape Town-Kimberley railway line. The town is a major rail junction. The immediate study area is traversed by the De Aar-Noupoort line. Other major infrastructure is associated with Eskom's large Hydra substation located between the N10 and the railway line (approximately 5 km north-west of the site). Nineteen transmission lines currently feed into Hydra, several of which across the immediate study area (Photograph 3.3 and 3.4). Kestrel MTS has been approved on a site approximately 4.8 km north-east of the Hydra substation but is yet to be constructed. The Hercules PV cluster projects are proposed to feed into Kestrel MTS.



Photograph 3.1: N10 looking west with site in area to the right



Photograph 3.2: Railway line and service road to the north of the study area



Photograph 3.3: Hydra substation



Photograph 3.4: Transmission lines associated with Hydra substation

The study area is located on the Great Escarpment in the Central Karoo region. The region is prone to multi-year droughts. The study area landscape is generally flat, punctuated by small ranges of koppies. The veld consists of karroid scrub on plains and shrubland on the slopes of kopjes. The scrub is characterized by the predominance of grasses in good rainfall years, increasing the risk of veld fires. The landscape is essentially treeless, with trees confined to ephemeral drainage courses and farmyards. The immediate study is located at the headwaters of the Brak River and is traversed by several ephemeral streams.

The study area properties are used primarily for livestock farming, predominantly of sheep, but also including goat. The area is traditionally a wool farming area. Angora wool is also produced. Veld carrying capacities are modest, around 2 ha per sheep.¹⁵ Most operations rely on boreholes and watering points. No significant cropping activities are associated with the study area. Economic farming units are large, typically consisting of several properties. Some farmers lease additional land. The study area settlement pattern is consequently sparse, and mainly concentrated on a few base farms, typically near public roads. Labourers typically live on the base properties or are transported in daily from De Aar. Caretaker staff reside on some properties. Farmsteads and labourers' houses on some properties have become redundant and are no longer inhabited.

No protected natural areas are located in or in significant proximity to the study area. Tourism in the immediate study area is limited. Only two receptors are located in significant proximity to the project, namely Kampfontein Guest Farm and Rietfontein Guest House. Kampfontein is located between the Hydra substation and the N10, approximately 8 km west of the site. The Mega Springbuck game breeding, capture and hunting operation is based on the same premises. Hunting takes place on various properties in the broader region. The Kampfontein Guest Farm facility caters to groups of hunters as well as travellers (overnight accommodation). The built-up complex is located at the foot of a kopje, and faces west (towards the N10), and away from the project. Rietfontein Guest House mainly caters to artists in residence at the print studio on the property (see below).

3.8.2 Affected properties

The Roode Kraal PV site is located on a portion of a single property, Roode Kraal 28/RE. The property straddles the De Aar-Noupoort railway line. Three discrete development areas (fenced in areas, mainly occupied by PV arrays) are proposed, all to the south of the railway line, a total footprint of approximately 680 ha (Figure 3.5 and see Photograph 3.2). The Roode Kraal site (1 120 ha) occupies most of the central portion of 28/RE. The Roode Kraal PV construction- and operational phase terrains are proposed in a cluster approximately 2.5 km north of the N10 and 3.5 km south of the railway line. Site access is proposed off the N10 via an existing internal road on Farm 150 (Stuurmanskuil, not part of any Mulilo projects). A single controlled access point is proposed, on 28/RE (where the road enters the fenced-in development area).

¹⁵ <https://gis.elsenburg.com/apps/cfm/#>



Figure 3.5: Proposed Roode Kraal PV layout: site (dark pink outline), site access road (light blue), access control point (white triangle), fenced-in/development areas (light pink outlines), construction phase terrains (black fill), operational phase terrains (white fill). Also indicated are the directly affected properties (yellow outlines), key roads (red), existing transmission lines (orange), and railway lines (black).

Roode Kraal 28/RE is owned by Ms Retief. The property borders onto 7 other properties, two of which (28/1, 28/2) also owned by Ms Retief (Figure 3.6). The remaining 5 properties belong to 4 landowners. Two of the 5 properties only share single boundary points with the site property. Properties located to the north and west of the site form part of other Hercules PV cluster projects. All study properties are affected by existing transmission lines. This is linked to the presence of Hydra substation. Three properties (and Rooikraal estate) are bisected by the De Aar-Noupoort railway line. Two properties are bisected by the N10.

No dwellings are located on Roode Kraal 28/RE. The owner, Ms Retief, is retired and lives on 28/2 (Table 3.4). The farmstead (Rooikraal) is located adjacent to the railway line, approximately 5.3 km to the east of the site. The Rooikraal estate, which also includes adjacent Roode Kraal 28/1 and 28/2, are leased out to Mr Pieter du Toit (Rietfontein farm) for grazing. Mr du Toit's operation is based on Riet Fountain 6/RE.

6/2			Owner resident in Rietfontein farmstead; Two workers resident; Rietfontein Guest House near farmstead on adjacent 6/4; 6/2 bisected by railway line Existing 1 x 132 kV line; Hercules PV site
-----	--	--	---

Apart from Rooikraal (28/2), dwellings are also located on Wag en Bittje 5/RE (Wag 'n Bietjie), Riet Fountain 6/RE (Rietfontein), Farm 150 (Stuurmanskul), and Hartebeest Hoek 31/RE (Hartebeeshoek). The owners of 5/RE, 6/RE and 150 and small numbers of farm workers reside on these properties. The farmstead on 31/RE is no longer inhabited (the owner is based in De Aar), but a caretaker resides on the property (Photograph 3.5). Site-adjacent properties are primarily used for grazing, mainly for raising sheep and goat (including Angora). Some of the study properties are leased out to local farmers for grazing. Game occurs on several properties, but hunting is limited to seasonal culling by the owners. No tourism facilities are located on the 8 study properties.



Photograph 3.5: Entrance to Hartebeest Hoek 31/RE of N10 with farmyard in the background

3.8.3 Relationship to social receptors

The areas sense of place is dominated by the presence of Hydra and 19 transmission lines feeding into Hydra, the N10 and the De Aar-Noupoort railway line. The properties to the north and west of the Roode Kraal PV site also form part of other Mulilo PV projects. All residential and tourism receptors are located 2.4 km or more from proposed panel development areas (Table 3.5). The nearest receptors, Rietfontein Guest House (Riet Fountain 6/4) and Rietfontein yard (2.7 km) on 6/RE are located on properties proposed for other Mulilo PV developments (Photograph 3.6 and 3.7). The

Hercules PV site (on 6/RE) is located between these two receptors and the Roode Kraal PV site. Both receptors are located near the railway line. The built complex on Kampfontein Guest Farm is located 10.3 km from the Roode Kraal site. The complex fronts west, away from the project. No significant sense of place or visual impacts on study area receptors are therefore associated with the proposed infrastructure. Construction phase- and Operational phase (substation, BESS, O&M) terrains are located >3.8 km from all receptors, i.e., not in significant proximity to any.



Photograph 3.6: Entrance to Rietfontein Guest Farm to north of study area



Photograph 3.7: Entrance to Rietfontein farmyard to north of study area

Table 3.5: Proposed infrastructure in relation to key receptors (clockwise from north)

FARM	OWNER	RECEPTORS	DISTANCE (km) ¹⁶			COMMENT
			PV	CON	OPER	
6/4	Du Toit	Rietfontein Guest House	2.7	4.1	3.9	Both properties part of Mulilo PV projects
6/RE		Rietfontein yard	2.4	4	3.8	
28/2	Retief	Rooikraal yard	5.3	8.7	9	Roode Kraal PV site on part of Retief estate (28/RE)
150	Van Zyl	Stuurmanskuil yard	3.5	4	4.1	Owner not part of Mulilo PV projects
31/RE	Horn	Hartebeeshoek yard	5.6	6.3	5.9	Hartebeest Hoek PV site; Farmstead no longer inhabited
135/3	Kampfontein Guest Farm	Boundary	9.8	10.9	10.6	Main viewshed towards N10 (away from project)
		Built cluster	10.3	11.5	11.1	
5/RE	Van der Merwe	Wag 'n Bietjie yard	7.9	9.2	9.6	Part of Pixley PV cluster

The project footprint would result in the loss of a relatively small portions of the Rooikraal estate to farming. The long-term lessee of 28/RE has raised no concerns with regard to the loss of grazing or with the proposed layout. Proposed infrastructure is located 9.8 km and further from the Kampfontein boundary, i.e. not in significant proximity to any hunting associated with Mega Springbuck. The proposed project access road will make use of an existing internal farm road on Farm 150. The road will

¹⁶ Distance from receptors to PV development areas (PV), construction phase terrains (CON) and operational phase terrains (substation, BESS, O&M).

not affect access to any farmyards. The road is not located in any significant proximity to dwellings. Farm 150 and owner do not form part of any Mulilo development proposals. The owner has raised concerns with regard to the proposed road portion across Farm 150. Concerns relate to veld disturbance, disruption to farming operations during the construction phase, and an increased security risk to his stock farming operation (van Zyl, pers. comm).

3.8.4 Relationship to other renewable energy facilities

The De Aar study area does not fall within a Renewable Energy Development Zone (REDZ). Despite this the area has been the focus of several solar PV and wind-based Renewable Energy Facility (REF) developments since around 2010. This largely linked to Hydra substation and the establishment of other main transfer stations within the central powerline corridor, including the approved Kestrel MTS into which the Hercules PV cluster projects would feed. The DFF&E's renewable energy applications website¹⁷ indicates several approved applications within a 30 km radius of the Hercules PV site (Figure 3.7). Not indicated on the map below, are the 3 other Hercules PV cluster sites to the south of the Hercules PV site.

Approved PV projects near De Aar are all located north of the N10. These include the Pixley PV cluster (4 facilities) directly to the north of the site, and Badenhorst Dam PV closer to De Aar. Only four operational facilities are located within 30 km of the Hartebeest Hoek site, all to the north of De Aar and >15 km from the site. The first of these, Solar Capital De Aar 1 and De Aar Solar became operational in 2014. Solar Capital De Aar 3 became operational in 2016.¹⁸ The only operational WEFs within a 30-km radius of the site are the Mulilo Maanhaarberg De Aar 1 and 2 WEFs ~23 km north-east of the site.

The area around Hydra and Kestrel MTS is likely to see more development, either REFs and/ or transmission lines feeding into Kestrel. However, as indicated, the context is already dominated by transmission lines, Hydra and the railway line. Cumulative grazing losses to REF development on estates affected by multiple projects are unlikely to affect the viability of the relevant farming operations, as losses may be offset by income from the project, e.g. by leasing additional grazing.

¹⁷ https://egis.environment.gov.za/renewable_energy (September 2024).

¹⁸ <https://www.solarcapital.co.za/our-projects/de-aar-3-project-2/>

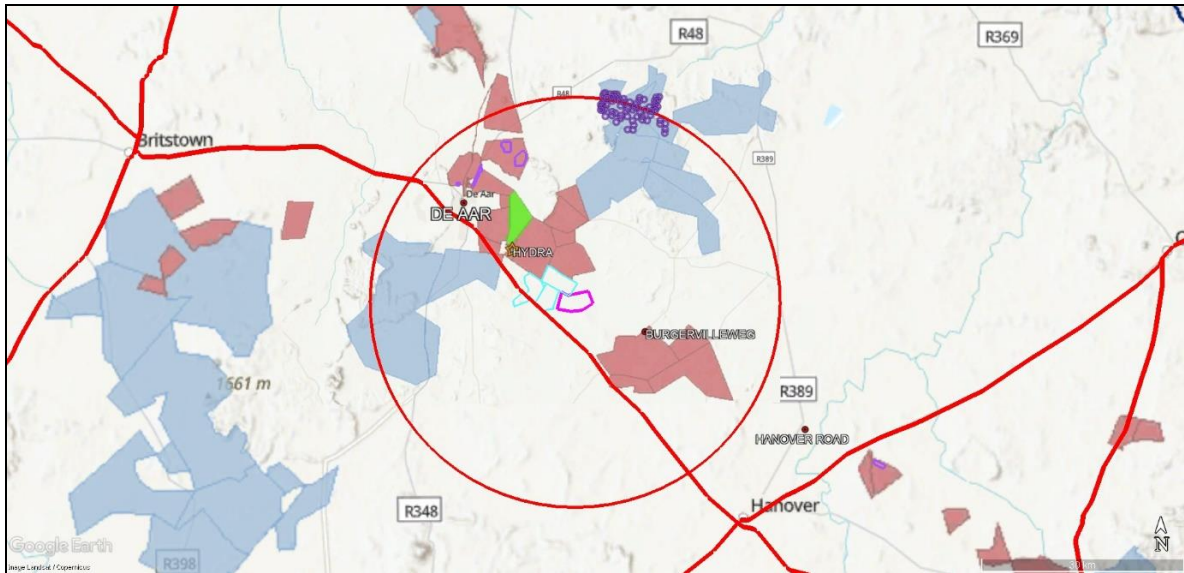


Figure 3.7: Roode Kraal PV site (pink outline) in relation to REF projects in the broader region; red circle indicates 30 km from the centre of the site. Red fill indicates PV-related projects, blue fill WEFs, green fill Biomass¹⁹. Also indicated are other Hercules PV cluster projects (light blue), operational PV facilities (purple outlines), operational De Aar 1 and 2 WEFs turbines (purple circles), and national roads (red lines) (Source: DFF&E)

¹⁹ The subject property has witnessed 35 applications. Biomass has since been replaced by Solar.

SECTION 4: OVERVIEW OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an overview and assessment of the key social issues identified by the study. These findings are based on:

- Review of project related information.
- Review of key policy and planning documents.
- Site visit to the study area and interviews with affected landowners.
- Experience with similar projects.

The section is divided into the following sections:

- Compatibility with relevant policy and planning context ("planning fit").
- Social issues associated with the construction phase.
- Social issues associated with the operational phase.
- Social issues associated with the decommissioning phase.
- Social implications of "no development" alternative.
- Social implications associated with cumulative impacts.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and EM IDP also support the development of renewable energy. The development of the proposed PV SEF is therefore supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

Potential positive impacts

- Creation of employment and business opportunities.

Potential negative impacts

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

4.3.1 Creation of local employment and business opportunities

The construction phase will extend over a period of approximately 18 months and create in the region of 200-250 employment opportunities. Members from the local communities in the area, specifically De Aar, would be able to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill for the construction phase will be in the region of R 30 million (2024 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The capital expenditure will be approximately R 4.5 billion (2024 Rand value). Due the lack of diversification in the local economy the potential for local companies is likely to be limited. Most benefits are therefore likely to accrue to contractors and engineering companies based outside the EM. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

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

The potential benefits for local communities are confirmed by the findings of the Overview of the IPPPP undertaken by the Department of Energy, National Treasury and DBSA (December 2021). The study found that to date, a total of 63 291 job years²⁰ have been created for South African citizens, of which 48 110 job years were in construction and 15 182 in operations. By the end of December 2021, 85 projects had successfully completed construction and moved into operation. These projects created 44 172 job years of employment, compared to the anticipated 30 488. This was 45% more than planned.

In terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. For active projects, the expectation for local community participation was 13 284 job years. To date 25 272 job years have been realised (i.e. 90% more than initially planned), with 23 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 74%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 44% and 48% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens

²⁰ The equivalent of a full-time employment opportunity for one person for one year.

and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (85%) has significantly exceeded the 50% target and the 30% minimum threshold. Likewise, the share of skilled black citizens (as a percentage of skilled employees) for both construction (71%) and operations (82%) has also exceeded the 30% target and minimum threshold of 18%. The share of local community members as a share of SA-based employees was 48% and 70% for construction and operations respectively – exceeding the minimum threshold of 12% and the target of 20%.

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

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	With Enhancement
Extent	Local – Regional (3)	Local – Regional (4)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (44)	Medium (56)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement:		
Employment		
• Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, most 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 EM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase. • The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. • Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		
Business		
• The proponent should liaise with the EM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security		

companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.

- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The ELM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

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

Residual impacts: Improved pool of skills and experience in the local area.

Assessment of No-Go option

There is no impact, as the current status quo will be maintained.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the way 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.

Workers are likely to be accommodated in nearby town of De Aar. As indicated above, the objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community will therefore be negligible. The balance of semi-skilled and skilled workers will be accommodated in De Aar.

While the risks associated with construction workers at a community level will be low, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. However, given the nature of construction projects, it is not possible to totally avoid these potential impacts at an individual or family level.

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

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (21)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: • Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. • The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents. • Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. • The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase that representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP. • The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP. • The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP. • The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site. • The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. • No construction workers, except for security personnel, should be permitted to stay over-night on the site.		
Residual impacts: Impacts on family and community relations that may, in some cases,		

persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Assessment of No-Go option

There is no impact as the current status quo would be maintained.

4.3.3 Influx of job seekers

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

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

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.3.2. The findings of the SIA indicate that the potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. This is due to the isolated location of the area and the limited economic and employment opportunities in De Aar. The risks associated with the influx of job seekers are therefore likely to be low.

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

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (18)	Low (15)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS

Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation: It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area. In addition: • Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. • The proponent, in consultation with the EM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. • The proponent should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities. • The proponent should implement a policy that no employment will be available at the gate.		
Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		

Assessment of No-Go option

There is no impact as the current status quo would be maintained.

4.3.4 Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers and farm workers in the vicinity of the site. Interviewees indicated that stock theft is currently largely under control. Farmer owners indicated that this was linked to establishment of private security cameras. Mr du Toit indicated that it would make sense for the access point proposed for the Jupiter PV SEF near the N10 on the road serving Jupiter, Hercules and Hartebeest to be constructed irrespective of Jupiter gets constructed. That would reduce the portion of access road not covered by access control (du Toit, pers. comm).

In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase. Mitigation measures to address these risks are outlined below.

The owner of Stuurmanskul (Farm 150) raised concerns about the proposed road portion across Farm 150. Concerns relate to veld disturbance, disruption to farming operations during the construction phase, and an increased security risk to his stock farming operation (van Zyl, pers. comm).

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

Nature: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	With Mitigation
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (33)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes
Mitigation: - 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.		
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.

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October.

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

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	With Mitigation
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: - The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. - Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. - Smoking on site should be confined to designated areas. - Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months. - Contractor should provide adequate fire-fighting equipment on-site. - Contractor should provide fire-fighting training to selected construction staff. - No construction staff, except for security staff, to be accommodated on site overnight. - As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Residual impacts No, provided losses are compensated for.		

Assessment of No-Go option

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

4.3.6 Nuisance impacts associated with construction related activities

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated. The number of potentially sensitive social receptors, such as farmsteads, will also be low due to the sparse settlement patterns and small number of farmsteads in the area.

The owner of Rietfontein (6/RE) and Rietfontein Guest House (6/4) indicated that dust generated during the construction phase was a potential concern and posed a potential risk to shearing operations (du Toit, pers. comm). This will need to be addressed during the construction phase.

Table 4.6: Assessment of the impacts associated with construction related activities

Nature: Potential noise, dust and safety impacts associated with construction related activities		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (15)
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: - The movement of construction vehicles on the site should be confined to agreed access road/s. - 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. - The movement of heavy vehicles associated with the construction phase should be timed to avoid times of the week, such as weekends, when the volume of traffic travelling along the access roads may be higher. - 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. - Minimise the footprint area of areas that are cleared for the PV SEF. - Dust suppression measures should be implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. - All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.		
Residual impacts If damage to local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage.		

Assessment of No-Go option

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

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing. The impact on farmland associated with the construction phase can be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Existing internal roads should be used where possible. This requires careful site planning and management of operations. If new roads are required, these roads should be rehabilitated on completion of the construction phase. In addition, the landowners will be compensated for the loss of land.

Based on the interviews with affected landowners no footprint issues were raised.

Table 4.7: Assessment of impact on farmland due to construction related activities

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Low (20)
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
Mitigation: • Compensation of loss of land should be paid before construction activities commence. • An Environmental Control Officer (ECO) should be appointed to monitor the construction phase. • Existing internal roads should be used where possible. If new roads are required, these roads should be rehabilitated on completion of the construction phase. • The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised. • All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase. • The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation		

programme should be included in the EMPr. • The implementation of the Rehabilitation Programme should be monitored by the ECO.
Residual impacts: Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.

Assessment of No-Go option

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

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

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

Potential positive impacts

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

Potential negative impacts

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

4.4.1 Improve energy security and support the renewable energy sector

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

Improved energy security

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. The Minister of Mineral Resources and Energy, Gwede Mantashe, indicated in February 2023 that the cost of load shedding was estimated at R1 billion a day²¹. The South African Reserve Bank indicated in February 2023 that stage 3 and stage 6 loadshedding cost the South African economy between R204 million and R899 million a day.²²

A survey of 3 984 small business owners in 2019 found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their

²¹ <https://www.citizen.co.za/news/load-shedding-cost-economy-billion/>

²² <https://businesstech.co.za/news/energy/662515/stage-6-load-shedding-costs-south-africa-r900-million-a-day-sarb/>

revenue, with 40% of small businesses losing 20% or more of revenue during due to load shedding period²³.

Impact of a coal powered economy

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

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

Benefits associated with REIPPPP

Through the competitive bidding process, the IPPPP has effectively leveraged rapid, global technology developments and price trends, buying clean energy at lower and lower rates with every bid cycle, resulting in SA getting the benefit of renewable energy at some of the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.94/kWh, while solar PV has dropped with 75% to R1.14/kWh between BW1 and BW4.

Prices contracted under the REIPPPP for all technologies are well below the published REFIT prices. The REIPPPP has effectively translated policy and planning into delivery of clean energy at very competitive prices. As such it is contributing to the national aspirations of secure, affordable energy, lower carbon intensity and a transformed 'green' economy.

Table 4.8: Improve energy security and support renewable sector

Nature: Development of infrastructure to improve energy security and support the renewable sector		
	Without Enhancement	With Enhancement
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	High (64)	High (85)
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable	Yes, impact of climate change on	Reduced CO ₂ emissions and impact

²³ "How does load shedding affect small business in SA?". The Yoco Small Business Pulse (3: Q1 2019):

loss of resources?	ecosystems	on climate change
Can impact be mitigated?	Yes	
Enhancement: • Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members. • Maximise opportunities for local content, procurement, and community shareholding.		
Residual impacts: Overall reduction in CO ₂ emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.		

Assessment of No-Go option

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

4.4.2 Creation of employment opportunities

The PV SEF will create in the region of 20-30 employment opportunities during the operational phase, of which 70% will be unskilled, 25% semi-skilled 25%, and 5% skilled 5%. Most of the unskilled and low skilled workers will be local HDI residents from De Aar. Based on similar projects the annual operating budget for each PV SEF will be in the region of R 30 million (2024 Rand values), including wages.

Table 4.9: Assessment of employment and business creation opportunities

Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Enhancement	With Enhancement
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Low (28)	Medium (40)
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	
Employment - Where reasonable and practical, the proponent should appoint members from the local community and local contractors. - Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. - Before the operational phase commences the proponent should meet with representatives from the EM to establish the existence of a skills database for the area. - 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 operational phase of the project. • Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the operational 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 EM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers prior to the commencement of the operational. These companies should be notified of the tender process and invited to bid for project-related work. Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
Residual impacts: Creation of permanent employment and skills development opportunities for members from the local community and creation of additional business and economic opportunities in the area

Assessment of No-Go option

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

4.4.3 Generate income for affected landowners

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed PV SEFs. In terms of the rental agreement the affected landowner will be paid an annual amount dependent upon the area affected. The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. Given the low carrying capacity of the veld the additional income represents a significant benefit for the affected landowner.

Table 4.10: Assessment of benefits associated with income generated for the affected farmer(s)

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

Assessment of No-Go option

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

4.4.4 Benefits associated with the socio-economic development contributions

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

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

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2%, which is 101% higher than the minimum threshold level. To date (across BW1-4) a total contribution of R22.8 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

As a percentage of revenue, SED obligations become effective only when operations commence, and revenue is generated. Of the 91 IPPs that have reached financial close (BW1–BW4), 85 are operational. The SED contributions associated with these 85 projects has amounted to R 1.8 billion to date.

In terms of ED and SED spend, education, social welfare, and health care initiatives have a SED focus. SED spend on education has been almost double the expenditure on enterprise development. In this regard IPPs have supported 1 388 education institutions with a total of R437 million in contributions, from 2015 to the end of June 2021. A total of 1 276 bursaries, amounting to R210.8 million, have been awarded by 67 IPPs from 2015 until the end of June 2021. The largest portion of the bursaries were awarded to African and Coloured students (97.4%), with women and girls receiving 56.3% of total bursaries. The Northern Cape province benefitted most from the bursaries awarded, with 57.2%, followed by the Eastern Cape (20.2%) and Western Cape (14.1%). Enterprise development and social welfare are the focus areas that have received the second highest share of the contributions to date.

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

located in rural areas create an opportunity to benefit the local and regional economy through the creation of jobs and tax revenues.

The support for SED initiatives does therefore create significant benefits for local rural communities. However, these initiatives can also be mismanaged. This is an issue that will need to be addressed when identifying and managing SED initiatives.

Table 4.11: Assessment of benefits associated with socio-economic development contributions

Nature: Benefits associated with support for local community's form SED contributions		
	Without Enhancement	With Enhancement²⁴
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Medium (30)	High (65)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement: • The proponents should liaise with the EM to identify projects that can be supported by SED contributions. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. • Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.		
Residual impacts: Promotion of social and economic development and improvement in the overall well-being of the community		

Assessment of No-Go option

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

4.4.5 Visual impact and impact on sense of place

The proposed PV SEF has the potential to impact on the areas existing rural sense of place. None of the affected landowners interviewed raised any concerns regarding visual impacts on the areas sense of place. In addition, the areas existing sense of place has been impacted by transmission lines associated with the Hydra substation and railway line. The potential impact on the areas sense of place is likely to be limited. The findings of the Visual Impact Assessment (VIA) (David Gibbs, 2024) notes that the layout has responded well to visual indicators and maximises the visual absorption capacity of the site by locating the various components of the proposal within areas of low visual sensitivity, outside of the visual buffers, in order for the

²⁴ Enhancement assumes effective management of the community trust

proposed solar installation to become as visually recessive as possible. Landscape implementation can further augment the visual absorption capacity of the site.

Overall, the proposal is assessed to have a visual impact of medium significance, reducing to low significance with mitigation in the form of the landscaping and architectural controls as proposed.

Table 4.12: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place.		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (27)
Status	Negative	Negative
Reversibility	Yes, PV SEF components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: The recommendations contained in the VIA should be implemented.		
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.

4.4.6 Potential impact on property values

The potential visual impacts associated with the proposed PV SEFs have the potential to impact on property values. Based on the results of a literature review undertaken for wind farms the potential impact on property values in rural areas is likely to be limited. The findings are also likely to be relevant to PV SEFs. In this regard a study undertaken in Australia in 2016 (Urbis Pty Ltd) found that:

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

The impact of PV SEFs on property values is likely to be lower than the impact of WEFs due to the reduced visual impact. The Impact of the proposed PV SEF on property values is therefore likely to be low.

Table 4.13: Assessment of potential impact on property values and operations

Nature: Potential impact of the SEF on property values		
	Without Mitigation	With Enhancement / Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Yes, PV SEF components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement:	The recommendations contained in the VIA should be implemented.	
Residual impacts:	Linked to visual impact on sense of place.	

Assessment of No-Go option

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

4.4.7 Potential impact on tourism

The potential visual impacts associated with the proposed PV SEF has the potential to impact on tourism facilities and tourism in the area. Based on the site visit the only tourism facility located near the site is the Rietfontein Guest Farm located to the north of the railway line. The proposed PV SEFs are likely to be largely screened from the guest farm by the natural topography and trees planted around the farmyard. The owner of the Rietfontein Guest Farm raised no concerns about the potential impact on his facility. The potential impact on the Rietfontein Guest Farm will therefore be limited. The impact of the proposed PV SEF on tourism in the PKSDM and EM will also be negligible.

Table 4.14: Impact on tourism in the region

Nature: Potential impact of the PV SEF on local tourism		
	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Yes, PV SEF components and other infrastructure can be removed.	

Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement: The recommendations contained in the VIA should be implemented.		
Residual impacts: Linked to visual impact on sense of place.		

Assessment of No-Go option

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

4.5 ASSESSMENT OF DECOMMISSIONING PHASE

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of 20-30 jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 20 - 25 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning. Given the number of people employed during the operational phase (~ 20-30), the social impacts at a community level associated with decommissioning will be limited. In addition, potential impacts associated with the decommissioning phase can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact. The significance would be Low (positive) with enhancement due to limited opportunities and short duration.

Table 4.14: Social impacts associated with decommissioning

Nature Social impacts associated with retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact		
	Without Mitigation	With Mitigation
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	N/A	
Irreplaceable loss of resources?	No	No

Can impact be mitigated?	Yes	
Mitigation: - The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned. - All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.		
Residual impacts No, provided effective retrenchment package.		

Assessment on No-Go option

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

4.6 CUMULATIVE IMPACT ON SENSE OF PLACE

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

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

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

There are several solar farms proposed in the study area. The potential for combined and sequential visibility is therefore likely. However, as indicated above, the areas sense of place has been impacted by the Hydra substation and the associated transmission lines.

Table 4.15: Cumulative impacts on sense of place and the landscape

Nature: Visual impacts associated with the establishment of more than one PV SEF and the potential impact on the area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Medium (30)
Status (positive/negative)	Negative	Negative
Reversibility	Yes. PV SEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: See below		

Assessment of No-Go option

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

Recommended mitigation measures

The recommendations of the VIA should be implemented.

4.7 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The establishment of the proposed PV SEF and other renewable energy projects in the area does have the potential to place pressure on the local towns in the EM, specifically De Aar. The impact will depend on the timing of the construction phase for the different projects. However, the potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and other associated renewable energy projects in the EM. These benefits will create opportunities for investment in the EM and PKSDM, including the opportunity to up-grade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. The proposed SEF is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED. This will provide revenue that can be used by the EM to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial, and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the EM.

Table 4.16: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed PV SEF, in the ELM has the potential to place pressure on local services, specifically medical, education and accommodation.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Medium (30) ²⁵
Status (positive/negative)	Negative	Negative
Reversibility	Yes. SEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: The proponent should liaise with the ELM to address potential impacts on local services.		

Assessment on No-Go option

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

4.8 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed PV SEFs, will also create several socio-economic opportunities for the EM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (December 2021) indicates that to date (across BW1-4) a total contribution of R22.8 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

²⁵ With effective mitigation and planning, the significance will be Low Negative.

Table 4.17: Cumulative impacts on local economy

Nature: The establishment of renewable energy facilities and associated projects, such as the SEF, in the ELM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	High (8)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (36)	High (60)
Status (positive/negative)	Positive	Positive
Reversibility	Yes. SEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed SEF, within the EM should be supported.		

Assessment of No-Go option

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

4.9 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the Project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The project also aims to reduce the carbon footprint associated with energy generation. As indicated above, energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

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

Table 4.18: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to improve energy security and assist to support with the development of clean, renewable energy		
	Without Enhancement ²⁶	With Enhancement ²⁷
Extent	Local-International (4)	Local-International (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	Moderate (56)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	
Can impact be mitigated?	Yes	
Enhancement: The proposed SEF should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.		
Residual impacts: Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change.		

²⁶ Assumes project is not developed.

²⁷ Assumes project is developed.

SECTION 5: SUMMARY OF KEY FINDINGS

5.1 INTRODUCTION

Section 5 lists the key findings of the SIA. These findings are based on:

- Review of project related information.
- Review of key policy and planning documents.
- Site visit to the study area and interviews with affected landowners.
- 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.
- Decommissioning phase impacts.
- No-development option.

The issues and significance ratings will be confirmed during the assessment phase.

5.2.1 Policy and planning issues

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The PKSDM SDF and IDP and EM IDP also support the development of renewable energy. The development of the proposed SEF 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.

The construction phase is expected to extend over a period of ~18-24 months and create approximately 200-250 employment opportunities. Most of the employment opportunities, specifically the low and semi-skilled opportunities, are likely to be available to residents in the area, specifically residents from De Aar. Most of the beneficiaries are likely to be historically disadvantaged (HD) members from the community. This would represent a significant positive social benefit in an area with limited employment opportunities. However, in the absence of specific commitments from the developer to employ local contractors the potential for meaningful skills to local employment targets the benefits for members from the local communities may be limited. In addition, the low education and skills levels in the area may also hamper potential opportunities for local communities.

The potential benefits for local communities are confirmed by the findings of the Overview of the IPPPP undertaken by the Department of Energy, National Treasury and DBSA (December 2021). The review found that by the end of December 2021 the construction phase of the 85 renewable energy projects that had been successfully completed had created 44 172 job years²⁸ of employment, compared to the anticipated 30 488. This was 45% more than planned. The study also found that significantly more people from local communities were employed during construction than was initially planned.

The capital expenditure associated with the construction phase will be in the region of R 4.5 billion (2024 Rand value). A percentage of the wage bill will also be spent in the local economy which will create opportunities for local businesses in the EM. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

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

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

Table 5.1: Summary of social impacts during construction phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Creation of employment and business opportunities	Moderate (+)	Moderate (+)
Presence of construction workers and potential impacts on family structures and social networks	Low (-)	Low (-)
Influx of job seekers	Low (-)	Low (-)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Moderate (-)	Low (-)

²⁸ The equivalent of a full-time employment opportunity for one person for one year

Increased risk of grass fires	Moderate (-)	Low (-)
Impact of heavy vehicles and construction activities	Moderate (-)	Low (-)
Loss of farmland	Moderate (-)	Low (-)

5.2.3 Operational phase impacts

Potential positive impacts

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

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

Potential negative impacts

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

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation are likely to be **Low Negative**. All of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The significance of the impacts associated with the operational phase are summarised in Table 5.2.

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation	Significance With Mitigation
Promotion of renewable energy projects	Moderate (+)	Moderate (+)
Creation of employment and business opportunities	Low (+)	Moderate (+)
Establishment of Community Trust	Moderate (+)	High (+)
Generate income for affected landowner/s	Low (+)	Moderate (+)
Visual impact and impact on sense of place	Moderate (-)	Low (-)
Impact on tourism	Low (-)	Low (-)
Impact on property values	Low (-)	Low (-)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place

Several PV SEFs and WEFs are proposed in and or have been established in the EM. The potential for combined and sequential visibility impacts is therefore high. The cumulative impact is rated as **Medium Negative**.

Cumulative impact on local services and accommodation

The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy

The establishment of renewable energy facilities will create significant social and economic opportunities for the EM and PKSDM. The significance of this impact with enhancement was rated as **High Positive**.

5.2.5 Decommissioning phase

Given the number of people employed during the operational phase (~ 20-30), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities. The significance was assessed to be Low (positive).

5.2.6 Assessment of no-development option

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

5.3 CONCLUSION AND RECOMMENDATIONS

The findings of the SIA indicate that the development of the proposed Roode Kraal Solar PV1 and associated infrastructure will create employment and business opportunities for the EM during both the construction and operational phase of the project. All the potential negative impacts, except for the impact on sense of place, can also be effectively mitigated.

The creation of SED initiatives will also benefit the local community. The significance of this impact is rated as **High Positive**. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society. The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.

Statement and reasoned opinion

The establishment of the proposed Roode Kraal Solar PV1 and associated infrastructure is supported by the findings of the SIA.

ANNEXURE A

INTERVIEWS

- Du Toit, Mr Pieter (telephonic 2024-10-01). Riet Fountain 6/RE, 6/2, 6/4, Bloemhof 145/1; Rietfontein Guest House.
- Erasmus, Mr Pieter (telephonic 2024-10-02). Hartebeest Plaat 135/3; Kampfontein Guest Farm, Mega Springbuck.
- Horn, Mr Ian (telephonic 2024-10-01). Hartebeest Hoek 31/RE.
- Pienaar, Mr Dupie (telephonic 2024-10-01). Carolus Poort 3/RE, 3/3, 3/4, 3/12, Vetlaagte 4/RE, Riet Fountain 6/1.
- Van der Merwe, Mr Bennie (telephonic 2024-09-30; 2024-10-01). Wag en Bittje 5/RE, 5/3.
- Van Zyl, Mr Izak (telephonic 2024-10-02; 2024-10-03). Farm 150.

REFERENCES

- National Energy Act (2008).
- White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2019).
- National Infrastructure Plan (NIP) (2012 and 2021).
- National Development Plan (2011).
- Astronomy Geographic Advantage Act (Act No 21 of 2007).
- Northern Cape Provincial Growth and Development Strategy (2004-2014).
- Northern Cape Climate Change Response Strategy.
- Northern Cape Spatial Development Framework (2012).
- Northern Cape Province Green Document (2017/2018).
- Pixley ka Seme District Municipality Integrated Development Plan (2022-2027).
- Pixley ka Seme District Municipality Spatial Development Framework (2017).
- Emathanjeni Local Municipality Integrated Development Plan (2022-2027).
- Green Jobs Study (2011), IDC, DBSA Ltd and TIPS.
- Independent Power Producers Procurement Programme (IPPPP): An Overview (2017), Department of Energy, National Treasury and DBSA.
- Powering the Future: Renewable Energy Roll-out in South Africa (2013), Greenpeace South Africa.

ANNEXURE B: ASSESSMENT METHODOLOGY

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

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

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

The **significance** is determined by combining the criteria in the following formula:

$S = (E + D + M)P$; where

S = Significance weighting

E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

ANNEXURE C: CV

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

10 Firs Avenue, Claremont, 7708, South Africa
(Tel) 27-21-761 2355 - (Fax) 27-21-761 2355 - (Cell) 082 600 8266
(E-Mail) tony@tonybarbour.co.za

Tony Barbour's has 30 years' experience in the field of environmental consulting and management. His experience includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

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

EMPLOYMENT RECORD

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

LECTURING

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

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 260 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. All of the SIAs include interacting with and liaising with affected communities. In addition, he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

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

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

ANNEXURE D: DECLARATION OF INDEPENDENCE

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour, declare that --

General declaration:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

I declare that there are no circumstances that may compromise my objectivity in performing such work;

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

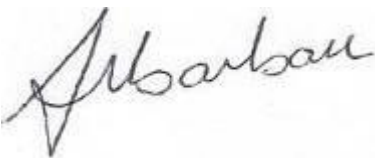
I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

all the particulars furnished by me in this form are true and correct;
and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

8 October 2024

Date: