SOCIAL IMPACT ASSESSMENT

HUGO WIND ENERGY FACILITY

WESTERN CAPE PROVINCE

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Prepared

by

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

ERM was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed up to 360 MW Hugo Wind Energy Facility (WEF) located ~ 14km east of De Doorns in the Breede Valley Municipality (BVM) in the Western Cape Province. 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.

However, the Western Cape Provincial Spatial Development Framework (WCSDF) highlights the importance of the Province's landscape and scenic assets, noting that they underpin the tourism economy. The WCPSDF identifies the mountain ranges belonging to the Cape Fold Belt together with the coastline as the most significant in scenic terms and underpin the WCP's tourism economy and notes that several scenic landscapes of high significance are under threat, including landscapes under pressure from large-scale infrastructural developments such as ***wind farms.*** The development of large-scale wind farms in the area to the south of the N1 may therefore not be ideal, specifically given the scenic and environmental qualities of the area.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 18-24 months and create in the region of 200-250 employment opportunities. Members from the local communities in Ermelo and the LM would qualify for some of the low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment

levels and limited job opportunities in the area, this will represent a social benefit. The total wage bill will be in the region of R 25 million (2023 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 BVM. The capital expenditure associated with the construction phase will be approximately R 8 billion (2023 Rand value). However, given the technical nature of the project most benefits will accrue to companies based in the Cape Metro. 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.

Potential negative impacts

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

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

Table 1: Summary of social impacts during construction phase

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

OPERATIONAL PHASE

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

Potential positive impacts

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

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit. However, it should be noted that the benefits are not site dependent.

Potential negative impacts

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

Concerns relating the potential visual impact of the proposed Hugo WEF on local properties and tourist related activities were raised by several property owners. The overall finding of the VIA (Logis July 2024) is that the proposed Hugo WEF will have a **High** to **Very High** visual impact on areas sense of place. However, despite the high visual impact VIA notes that the visual impacts are not considered to be fatal flaws for a development of this nature. The VIA therefore notes that the proposed Hugo WEF be supported from a visual perspective. The support is however subject to several wind turbines being relocated.

Based on the findings of the SIA the significance of the visual impact associated with the Hugo WEF on property values and tourism operations of visually impacted properties was rated as **Medium Negative** with and without mitigation. This implies that effective mitigation of the visual impacts will not be possible. This represents a negative externality for which the affected owners may potentially suffer a financial loss. In the even the Hugo WEF is approved, the developer of the WEF should liaise with the affected owners to assess the potential impact of the Hugo WEF on property values and future tourism operations and the option of some form of compensation if a direct impact can be established.

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

Table 2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	Medium (Positive)	High (Positive)
Creation of employment and business opportunities	Low (Positive)	Medium (Positive)
Generate income for local landowners	Low (Positive)	Medium (Positive)
Benefits associated with	Medium (Positive)	High (Positive)

socio-economic contributions to community development		
Visual impact on sense of place (VIA)	Very High-High (Negative)	Very High-High (Negative)
Visual impact and impact on sense of place (SIA)	Medium-High (Negative)	Medium-High (Negative)
Impact on property values of visually affected properties	Medium (Negative)	Low (Negative) [1]
Impact on tourism (affected properties)	Medium (Negative)	Low (Negative) [2]
Impact on tourism: Region	Low (Negative)	Low (Negative)

CUMULATIVE IMPACTS

Cumulative impact on sense of place
The potential visual impact of the proposed WEF and associated infrastructure on the areas sense of place is likely to **Very High Negative**.

Cumulative impact on local services and accommodation
The significance of this impact with mitigation was rated as **Low Negative**.

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

DECOMMISSIONING PHASE

Given the relatively small number of people employed during the operational phase (~ 20), 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 likely to be Low (negative).

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. However, the benefits associated with the WEF are not site dependent and would also be associated with an alternative site.

[1] Assumes affected property owners are fully compensated to their satisfaction for impact on property values.
[2] Assumes affected property owners are fully compensated to their satisfaction for impact on tourism operations.

CONCLUSION AND RECOMMENDATIONS

The findings of the SIA indicate that the proposed Hugo WEF project will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy that will improve energy security in South Africa and contribute towards reducing the countries carbon footprint.

However, the Hugo WEF will have a negative visual impact on the areas sense of place. Based on the findings of the VIA (MetroGIS) the impact on sense of place is rated as **High Negative**. Effective mitigation is not possible. Concerns relating the potential visual impact of the proposed Hugo WEF on the areas sense of place and tourist related activities were raised by several landowners. The impact of the Hugo WEF on tourism activities was rated as Medium Negative with and without mitigation. This implies that effective mitigation will not be possible. This represents a negative externality for which the affected owners may potentially suffer a financial loss. While this loss may be offset by some form of compensation, given the areas visual sensitivity and number of established nature reserves and associated eco-tourism facilities the overall suitability of the area for the development of large-scale wind energy facilities, such as the proposed Hugo WEF, is a concern. The cumulative impacts are rated as **Very High Negative** which heightens the concern.

Statement and reasoned opinion
Based on the findings of the SIA the suitability of establishing large WEFs, including the proposed Hugo WEF, in the area to the south of the N1 is questioned. The development of renewable energy facilities in the area to the south of the N1 represents a spillover from the Komsberg REDZ located to the north of the N1. From a long-term planning perspective this may not be ideal, specifically given the environmental and scenic qualities of the area. In this regard the Western Cape Provincial Spatial Development Framework highlights the importance to the Province's landscape and scenic assets and threat posed by large scale infrastructural developments such as wind farms.

It is also important to note that the benefits associated with the Hugo WEF are not site dependent and would also be associated with an alternative site. This point is relevant given the environmental and social sensitivity of the study area.

Recommendations
Should the proposed Hugo WEF be approved, the following recommendations should be implemented:

- The recommendations of the VIA should be implemented, including the relocation of identified wind turbines and installation of radar activated civil aviation lights.
- The developer of the Hugo WEF should liaise with the owners of visually impacted properties to assess the potential impact of the Hugo WEF on property values and future tourism operations and the option of some form of compensation if a direct impact can be established.

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CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Section 1.5, Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.6, Annexure B
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3,
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Interviews in 2021 (Annexure A)
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, Annexure B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4, Section 5,
(g) an identification of any areas to be avoided, including buffers;	Section 4
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.4,
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, Section 5
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 5.3
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	Annexure A, lists key stakeholders interviewed
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annexure A, lists key stakeholders interviewed
(q) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will	Comply with the Assessment Protocols that were

apply.	published on 20 March 2020, in Government Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. As at September 2020, there are no sensitivity layers on the Screening Tool for Socio-economic-features. Part A has therefore not been compiled for this assessment.

ACRONYMS

BESS	Battery Energy Storage System
BVM	Breede Valley Municipality
CWDM	Cape Winelands District Municipality
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Langeberg Municipality
MW	Megawatt
SDF	Spatial Development Framework
SIA	Social Impact Assessment
VIA	Visual Impact Assessment
WCP	Western Cape Province
WEF	Wind Energy Facility

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

ERM was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed up to 360 MW Hugo Wind Energy Facility (WEF) located ~ 14km east of De Doorns in the Breede Valley Municipality (BVM) in the Western Cape Province (Figure 1.1).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

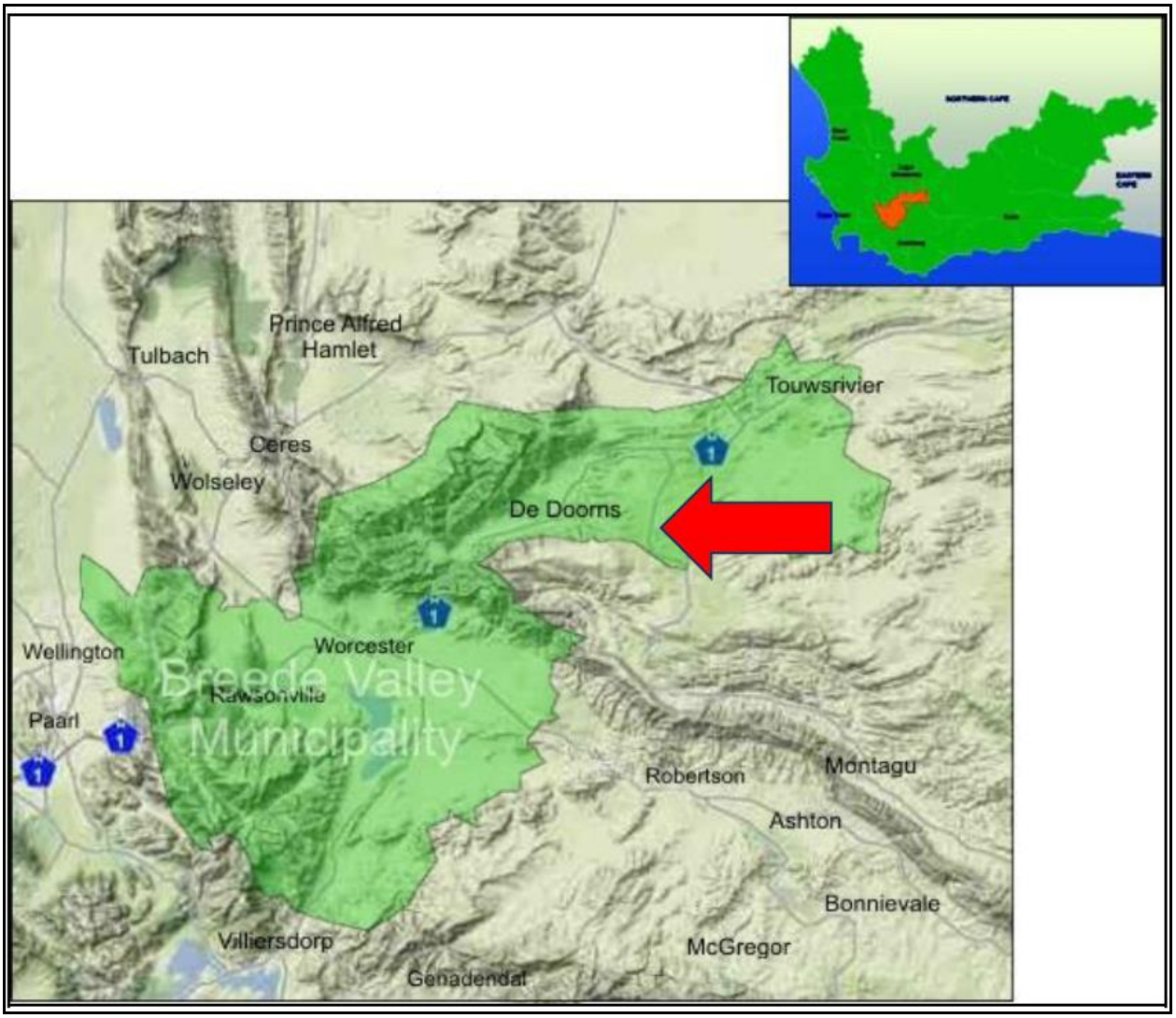


Figure 1.1: Location of Hugo WEF site (red arrow)

1.2 PROJECT DESCRIPTION

The proposed Hugo WEF will comprise up to 42 turbines with a maximum output capacity of up to 360 MW with an anticipated lifespan of 20-25 years. The WEF will be located on the following land parcels: RE 147; RE/172; 0/173; RE/174; and 9/148 (Table 1.1). The final design which will be requested for approval in the EA, will be determined based on the outcome of the specialist studies undertaken for the EIA phase of the development. The proposed turbine footprint and associated facility infrastructure will cover an area of up to 7900 ha, depending on the final design.

It is proposed that an on-site substation with a capacity up 132 kV with an up to 33 kV overhead / underground powerline will be installed. It is unknown at this stage how long the connection to the grid will be, or what route the cabling will be installed.

Table 1.1: Landowners details Hugo WEF

Landowner	**Farm Name**	**Farm No.**	**Portion No.**
Blue Dot Prop 424	Ou de Kraal	145	RE
Blue Dot Prop 424	Stinkfonteins Berg	147	RE
Blue Dot Prop 424	Stinkfontein	172	RE
Marius Hugo	Driehoek	173	0
Marius Hugo	Presents Kraal	174	RE
Dirk Uys Boerdery PTY LTD	Helpmakeer	148	9
Marius Hugo	Presents Kraal	174	RE
Dirk Uys	Helpmakeer	148	9

Table 1.2: Technical details of Hugo WEF

Maximum Generation Capacity	up to 360MW
Type of technology	Onshore Wind
Number of Turbines (Photograph 1.1)	Up to 42
WTG Hub Height from ground level	up to 150m
Blade Length	up to 100m
Rotor Diameter	up to 200m

Structure height (Tip Height)	up to 250m
Structure orientation	Wind regiment dependent
Operations and maintenance buildings (O&M building) with parking area	up to 1 HA
Site Access	Via the R318
Area occupied by inverter transformer stations/substations	up to 2.5 HA
Capacity of on-site substation	132/33kv
Battery Energy Storage System footprint (Photograph 1.2)	up to 5 HA
BESS type	Lithium-ion or Redox-flow technology, depending on the most feasible at the time of implementation
BESS Alternatives (site, technology, design and layout)	Same as above. See layout for design and position
Length of internal roads	TBD
Width of internal roads	Access roads to the site and between project components with a width of approximately 4.5 m and a servitude of 13.5 m.
Proximity to grid connection	TBD
Internal Cabling	Cabling between the turbines, to be laid underground where practical.
Height of fencing	TBD
Type of fencing	TBD
Water supply, volumes required	±26500m³ for the construction, commissioning and test phase (±26 months), the majority being consumed during year-one of the construction. ±90m³/annum for the life-of-WEF (20-25 years)

Photograph 1.1: Typical example of wind turbine

Photograph 1.2: Example of BESS located in storage containers

1.3 APPROACH TO STUDY

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development to enable them to better understand and comment on the potential social issues and impacts.
- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.
- 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.

1.4 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 WEF 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

There are no limitations that have a material bearing on 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 350 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 20 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 and assessment of key social issues.
- Section 5: Summary of key findings and recommendations.

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values, and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing, and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the "policy and planning fit[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 Energy Plan (2016).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- National Development Plan (2011).
- New Growth Path Framework.
- National Infrastructure Plan.
- Western Cape Provincial Spatial Development Framework (2014).
- Western Cape Infrastructure Framework (2013).
- Western Cape Provincial Strategic Plan (2014).
- Western Cape Green Economy Strategy (2013).
- One Cape 2040 (2012)
- Breede Valley Municipality Spatial Development Framework (2023).
- Breede Valley Integrated Development Plan (IDP) (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:

[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.

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

2.2.2 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.
- 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 Protocol[4], Government

[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

is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

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

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

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

2.2.4 Integrated 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

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).

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, 4800MW of Medupi, 4800MW 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 (Decommis-sioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400 1,000	1,600			
2023	750	-555				1000	1,600			500
2024			1,860				1,600		1000	500
2025						1000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2000	500
2028		-475				1000	1,600			500
2029		-1,694			1575	1000	1,600			500
2030		-1,050		2,500		1000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

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 to support investments 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 2021[5]. 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.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Western Province Spatial Development Framework

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

- Spatial justice.
- Sustainability and resilience.
- Spatial efficiency.

[5] Gazette No. 44951

- Accessibility.
- Quality and Livability.

Under Sustainability and Resilience, the PSDF notes that land development should be spatially compact, resource-frugal, compatible with cultural and scenic landscapes, and should not involve the conversion of high potential agricultural land or compromise ecosystems (p. 22).

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

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

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

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

Chapter 3.1 deals with the sustainable use of the WCP's assets. These are identified as biodiversity and ecosystem services; water resources; soils and mineral resources; resource consumption and disposal; and landscape and scenic assets. Policies are outlined for each of these themed assets. The last two themed assets are of specific relevance with regard to renewable energy.

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

Energy
With regard to energy use, the PSDF notes that the Cape Metro (albeit the province's most efficient user) and West Coast regions are the WCP's main energy users. It further notes that the WCP's electricity is primarily drawn from the national grid, which is dominated by coal-based power stations, and that the WCP currently has a small emergent renewable energy sector in the form of wind and solar generation facilities located in its more rural, sparsely populated areas. The PSDF also reiterates PGWC's commitment to shifting the economy towards gas[6] as transitional fuel (see WCIP below). Most of the energy discussion in the PSDF is dominated by aspects pertaining to natural gas. Regarding renewable energy, the following policy provisions are of relevance:

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

Climate change
Water scarcity is identified as probably the key risk associated with climate change. Essentially the same primary response objectives outlined in the 2014 Western Cape Climate Change Response Strategy are identified in the PSDF. These are energy efficiency, demand management and renewable energy. Policy provisions are made with regard to climate change adaptation and mitigation. Concerning renewable energy, the following is of relevance:

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

Landscape and scenic assets
A specialist study was undertaken into the Province's cultural and scenic landscapes. This study[7] was one of the informants of the 2014 PSDF. It established that the WCP's cultural and scenic landscapes are significant assets underpinning the tourism economy, but that these resources are being incrementally eroded and fragmented. According to the study agriculture is being reduced to 'islands', visual cluttering of the landscape by non-agricultural development is prevalent, and rural authenticity, character and scenic value are being eroded. The mountain ranges belonging to the Cape Fold Belt together with the coastline are identified as the most significant in scenic terms and underpin the WCP's tourism economy.

A number of scenic landscapes of high significance are under threat, mainly from low density urban sprawl, and require strategies to ensure their long-term protection. These include landscapes under pressure for large scale infrastructural developments such as

6 The PSDF at present envisages mainly from offshore West Coast gas fields via a terminal at Saldanha. The PSDF refers to the potential exploitation of own shale reserves, but also to the environmental sensitivity involved.
7 DEA&DP Winter and Oberholzer (2013). *Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape. - A Study prepared for the Western Cape Provincial Spatial Development Framework*. Draft 5. See footnote 1 above.

wind farms, solar energy facilities, transmission lines and shale gas development in the Central Karoo (p. 54). With regard to renewable energy, the following policy provisions are of relevance: R.5.6: Priority focus areas proposed for conservation or protection include -

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

2.3.2 Western Cape Infrastructure Plan

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

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

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

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

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

2.3.3 Western Cape Green Economy Strategy Framework

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

The Strategy's point of departure is that while the WCP faces significant challenges in terms of climate change and economic development. Two of the WCP's key economic sectors -

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3.4 Western Cape Climate Change Response Strategy

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

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

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

The Strategy will be executed through an implementation framework which will include an institutional framework for both internal and external stakeholders, with a strong emphasis on partnerships. The framework still has to be prepared. A monitoring and evaluation

system is further envisaged in order to track the transition to a low carbon and climate resilient WCP. Policy aspects dealing with mitigation are of specific relevance to renewable energy generation.

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

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

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

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

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

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

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

The document further notes that waste-to-energy opportunities are being investigated in order to facilitate large-scale rollout. Current investigation includes understanding the most

appropriate technologies for waste-to-energy projects as well as developing decision support tools for municipalities to implement waste-to-energy programmes).

***Priority areas identified for renewable energy development**:*

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

2.3.5 One Cape 2040 Strategy

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

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

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

2.3.6 Breede Valley Municipality Integrated Development Plan

The vision of the Breede Valley Municipality (BVM) is a *'A unique and caring Valley of service excellence, opportunity, and growth'*. The mission statement linked to the vision is *'To be a South African care capital by providing sustainable and affordable basic services in a safe and healthy environment, which promotes social and economic welfare through participative governance in a committed service-orientated approach and appreciates committed staff as the organisation's most valuable resource and key to service delivery'.*

The IDP lists 6 strategic objectives (SOs) that inform the vision, namely:

- SO1: To provide and maintain basic services and ensure social upliftment of the Breede Valley community.
- SO2: To create an enabling environment for employment and poverty eradication through proactive economic development and tourism.
- SO3: To ensure a safe, healthy, clean, and sustainable external environment for all Breede Valley's people.
- SO4: To provide democratic, accountable government for local communities and encourage involvement of communities and community organisations in the matters of local government.
- SO5: To ensure a healthy and productive workforce and an effective and efficient work environment.

- SO6: To assure a sustainable future through sound financial management, continuous revenue growth, corporate governance, and risk management practices.

SOs 1, 2 and 3 are relevant to the proposed development.

Chapter 5, the opportunity municipality, notes that the BVM strives to provide an opportunity for every resident to have access to all basic services and to live in a safe, caring and well-managed municipal environment. S0 1 and 2 are identified as the two SOs to drive this process. Chapter 5 lists a number of programmes linked to supporting SO 1 and 2. The programmes that are relevant to the development are:

- Programme 5.3: Implementing the local economic strategy.
- Programme 5.7: Unlocking the green economy.
- Programme 5.9: Rural development.

Programme 5.3: Implementing the local economic strategy. The IDP highlights the importance of prioritising infrastructure development as economic enabler for economic development. The importance to supporting SMMEs is also noted. The provision of energy infrastructure, such as the proposed renewable energy facility, supports this programme and will create opportunities to support SMMEs.

Programme 5.7: Unlocking the green economy.
The IDP notes that to address the challenges of climate change, Breede Valley Municipality will increasingly have to transition to a Green Economy in the future and refers to the current crisis in the electricity sector relating to electricity supply shortages and an increasing carbon footprint. The transition to a green economy is identified as tool to transform the current state of the local economy to one that is more sustainable from an economic, social, and environmental perspective. The transition includes transforming the local electricity sector to one that is more sustainable and aligned with the green economy concept. In this regard strategic green economic investments are expected to impact positively on several indicators across a number of sectors such as electricity supply, renewable energy share, employment and greenhouse gas emissions.

Programme 5.9: Rural development. The importance of supporting rural development is critical given the huge scale agricultural migration to the De Doorns area in recent years, including the annual influx of seasonal workers between September and March each year, when close to 11 000 workers are attracted to the area. This has huge implications for Breede Valley Municipality in its planning to deliver municipal services, especially refuse removal, proper clean toilets, running water for all, recreational facilities for children, access to housing, health services, crèche facilities and food security. The socio-economic development contributions associated with renewable energy developments can contribute towards supporting rural development projects.

2.2.3 Breede Valley Spatial Development Framework

The vision for the BVM is "A Breede Valley dedicated to providing efficient quality services by working in partnership with its citizens and businesses to enhance the quality of life and to create a safe, healthy and vibrant community in which to live, work, play and visit".
The vision is underpinned by six key development principles (DPs), namely:

- DP1: Economic Development.
- DP2: Vibrant Local Tourism.

- DP3: Enhanced residential character.
- DP4: Accessible social and civic facilities.
- DP5: Outdoor Lifestyle.
- DP6: Sustainable cities and communities

Development principles 1, 2, 5 and 6 are relevant to the proposed development.

Development Principle 1: Economic development. Identifies the need to establish a diverse economic base that attracts new business and investment.

Development Principle 2: Vibrant local tourism. The SDF notes that the Breede Valley's natural landscape, biodiversity, culture, and heritage provides a unique opportunity to promote its character and identity and refers to the need to establish scenic tourism routes and activities.

Development Principle 5: Outdoor lifestyle. The SDF highlights the importance of protecting and conserving environmental and other sensitive features.

Development Principle 6: Sustainable cities and communities. The SDF notes that the creation of resilient and sustainable urban environments requires the efficient use of resources and reduction of carbon emissions and the transition to a green economy system.

In terms of settlements, Worcester is identified as the area's primary node. The two settlements located near the site, De Doorns and Touwsriver are secondary nodes. De Doorns offers a range of service and commercial facilities and has become the business and shopping centre for the entire valley and surrounding settlements of Orchard and Stofland. The commercial activity, including major banks and retail outlets. The area also has a number of tourism opportunities in the form of wineries, restaurants, accommodation, and outdoors activities such as mountain biking and hiking. In terms of tourism, the area offers a number of tourism routes and activities.

Touwsrivier comprises of three areas.; firstly, the original Spoornet housing which is the original town; secondly, Topkamp is located east of the railway line and lastly Steenvliet which is located south of the original Spoornet housing. The commercial activity in Touwsrivier is clustered along Main Street. The SDF notes that the Steenvliet CBD is run down and redevelopment should be considered to create opportunities for the local community.

The SDF is informed by a set of Spatial Planning Categories (SPCs) based on the Western Cape Biodiversity Spatial Plan categories that also underpin the Provincial SDF. The SPCs are listed in Table 2.1.

Table 2.1: Sub-categories of each Spatial Planning Category (SPC)

SPC	**Description**
Core 1	These include habitats classified as highly irreplaceable, critically endangered, or endangered terrestrial (land), aquatic (rivers, wetlands & estuaries) and marine habitats.
Core 2	Includes compromised areas in a degraded condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. These areas should be rehabilitated and only low-impact, biodiversity-sensitive land-uses are appropriate.
Buffer 1	Areas may be degraded but still play an important role in supporting the functioning of Protected Areas and Critical Biodiversity Areas and are essential for delivering ecosystem services. These areas should be restored and/or managed to minimize impact on ecological infrastructure functioning.
Buffer 2	This category includes areas designated as Other Natural Areas, located in an extensive and/or intensive agriculture matrix as the dominant land use.
Intensive Agriculture	Includes areas comprised of a consolidation of the existing and potential intensive agricultural footprint. Significant or complete loss of natural habitat and ecological functioning has taken place.
Settlement	This includes existing cities, large and smaller towns, villages and hamlets.
Industry & Existing Mining	Areas are suitable for development but may still provide limited biodiversity and ecological infrastructure functions and should be managed in a way that minimises impacts on biodiversity and ecological infrastructure.

Figure 2.2 illustrates the location of natural open spaces in the BVM. As indicated in Figure 2.2, the study area appears to be located in an area identified as a Critical Biodiversity Area (green).

In terms of land uses, the main land use in the BVM is agriculture. The SDF notes that agricultural areas located near settlements should be reserved as prime agricultural land in the municipality and be protected from any development or land uses that may have a negative impact on the agricultural potential of the area. The SDF also highlights the importance of Agri-Tourism and the link with rural, agricultural landscapes.

The quality of the natural environment is also identified as a key attraction for tourism. The SDF notes that linked to the presence of high-quality natural environments in the municipality, one of the municipality's niche development areas is rural based tourism. Figure 2.3 illustrates the tourism opportunities in the area. As indicated in Figure 2.3, the site is located in an area designated as a critical biodiversity area (green).

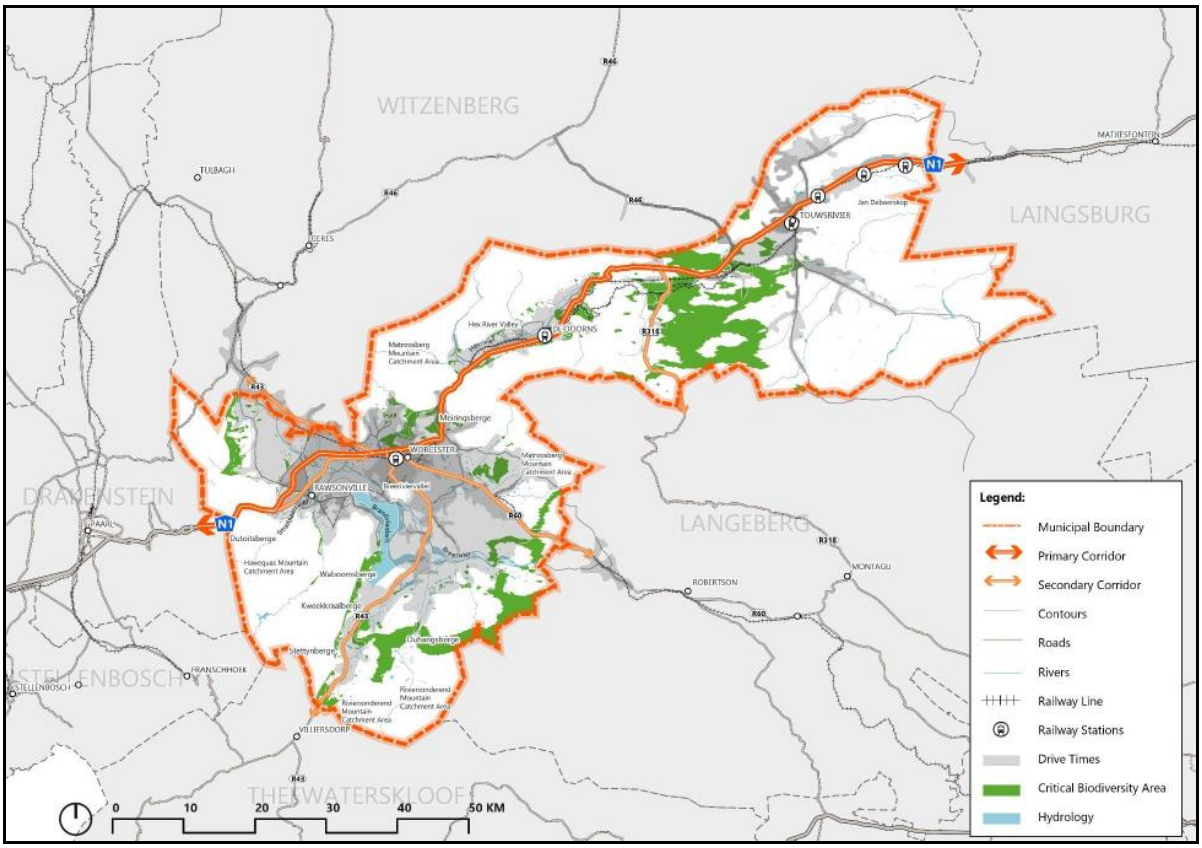


Figure 2.2: Natural Open Space

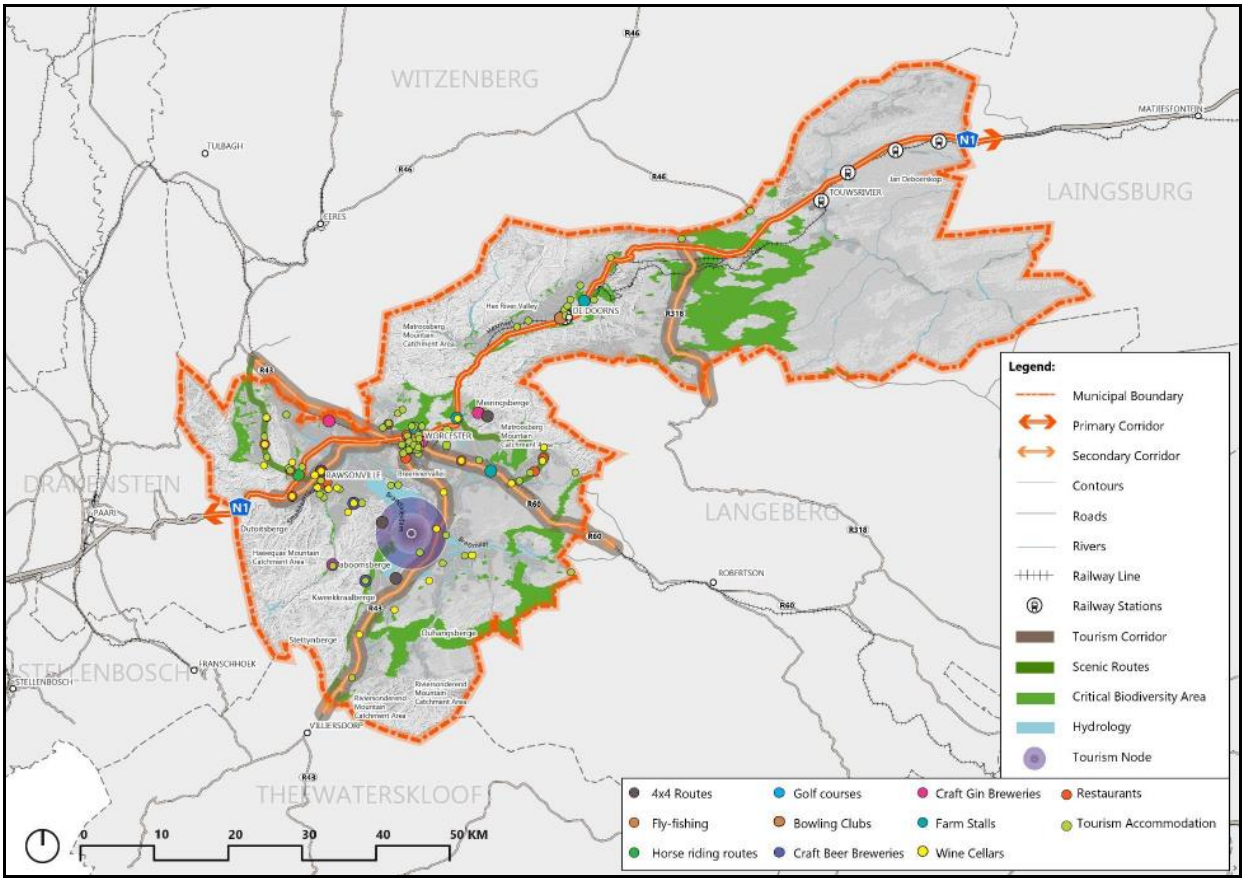


Figure 2.3: Natural Open Space

2.3 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 (June 2020), 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 section below provides an overview of the potential benefits associated with the renewable energy sector in South Africa based on the information contained in the Independent Power Producers Procurement Programme (IPPPP): An Overview (December 2021), Department of Energy, National Treasury and DBSA. 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. By2030, 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, 2022[8]):

- 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. As such it is contributing to the national aspirations of secure, affordable energy, lower carbon intensity and a transformed 'green' economy. 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. 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.

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 costs[9]), 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

[8] 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.

[9] 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)

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 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 Content[10]

The report notes that the REIPPP 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 years[11] 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.

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.

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

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

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 CO_2 ($MtonCO_2$) 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 ($20.5MtonCO_2$) achieved with only partial operations. A total of 72.1 Mton CO_2 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 2.2). 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 2.2: 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**		
EMMISIONS 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
EMMISIONS 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 (CO_2) 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 CO_2 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.

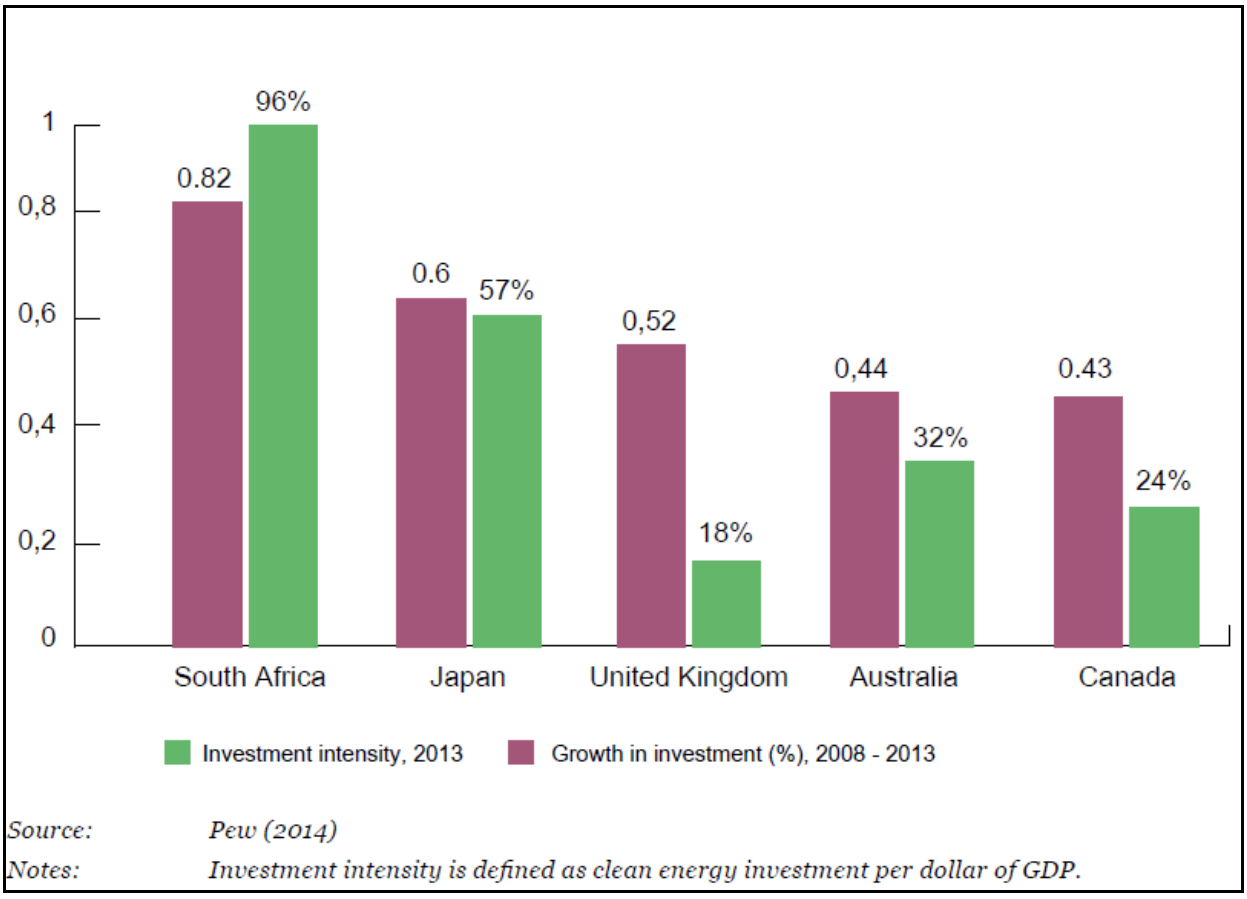
2.4.4 WWF SA Renewable Energy Vision 2030

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).



Source: *Pew (2014)*

Notes: *Investment intensity is defined as clean energy investment per dollar of GDP.*

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 flexibly 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 R*eport (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 The potential for local community benefits

In her thesis, Tait[12] 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.

2.4 IMPACT OF WIND FARMS ON PROPERTY VALUES

A literature review was undertaken as part of the SIA. The aim of the literature review was to identify what appeared to be "academically and or scientifically" based studies that have

[12] 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

been undertaken by reputable institutions post 2010. However, the literature review does not represent an exhaustive review. It should also be noted that the review does not constitute a property evaluation study and merely seeks to comment on the potential impact of wind farms on property values based on the findings of studies undertaken overseas. Five international articles were identified and reviewed namely:

- Stephen Gibbons (April 2014): Gone with the wind: Valuing the Visual Impacts of Wind turbines through house prices. London School of Economics and Political Sciences & Spatial Economics Research Centre, SERC Discussion Paper 159.
- Review of the Impact of Wind Farms on Property Values, Urbis Pty Ltd (2016): Commissioned by the Office of Environment and Heritage, NSW, Australia.
- Yasin Sunak and Reinhard Madlener (May 2012): The Impact of Wind Farms on Property Values: A Geographically Weighted Hedonic Pricing. School of Business and Economics / E.ON Energy Research Center, RWTH Aachen University. Model Working Paper No. 3/2012.
- Martin D. Heintzelman and Carrie M. Tuttle (March 3, 2011): Values in the Wind: A Hedonic Analysis of Wind Power Facilities. Economics and Financial Studies School of Business, Clarkson University.
- Ben Hoen, Jason P. Brown, Thomas Jackson, Ryan Wiser, Mark Thayer and Peter Cappers (August 2013): A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Ernest Orlando Lawrence Berkeley National Laboratory.

The key findings of the literature review are summarised below.

Stephen Gibbons (April 2014)

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

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

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

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

Ben Hoen, et al (August 2013)

The study was based on data from more than 50 000 home sales among 27 counties in nine states of the USA. The homes were located within 10 miles of 67 different wind facilities,

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

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

Urbis Pty Ltd (2016)

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

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

In addition to the above studies, a Property and Tourism Assessment was undertaken by Urban Econ as part of the EIA for the Angora WEF located to the southwest of the town of Richmond in the Northern Cape (Urban Econ 2024). A detailed literature (international and local) was undertaken as part of the study. The Urban Econ study found that the review of international literature corroborated the absence of direct linkages between wind farm developments and property prices with various studies confirming that there is no long-term impact of wind farms on property values.

The Urban Econ study also included a review of the impact on the local property market. The findings indicated that the introduction of wind farm developments did not negatively impact property sales in the specified areas. While farm sales remained stable, there was a noticeable increase in the average sale price. The presence of wind farms did not deter buyers, instead, it may have motivated them, as evidenced by the upward trend in both sales and prices. Overall, there is no clear indication of a negative correlation between wind farm development timing and property sales in this section. Local property agents in South Africa interviewed as part of the study noted that there was an increase in the price of

agricultural property linked to the potential to rent out portions to the IPP companies. The same trends continued where wind farms are installed.

2.5 IMPACT OF WIND FARMS ON TOURISM

A review of international literature in the impact of wind farms was undertaken as part of the SIA. Three articles were reviewed, namely:

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

The most comprehensive appears to be a review undertaken by Professor Cara Aitchison from the University of Edinburgh in 2012 which formed part Renewable Energy Inquiry by Scottish Government. The research by Aitchison found that previous research from other areas of the UK has demonstrated that wind farms are very unlikely to have any adverse impact on tourist numbers (volume), tourist expenditure (value) or tourism experience (satisfaction) (Glasgow Caledonian University, 2008; University of the West of England, 2004). In addition, to date, there is no evidence to demonstrate that any wind farm development in the UK or overseas has resulted in any adverse impact on tourism. In conclusion, the findings from both primary and secondary research relating to the actual and potential tourism impact of wind farms indicate that there will be neither an overall decline in the number of tourists visiting an area nor any overall financial loss in tourism-related earnings as a result of a wind farm development. The study by the Glasgow Caledonian University (2008) found that only a negligible fraction of tourists will change their decision whether to return to Scotland as a whole because they have seen a wind farm during their visit.

The study also found that 51.0% of respondents indicated that they thought wind farms could be tourist attractions. In this regard the visitor centre at the Whitelee Wind Farm in east Ayrshire Scotland run by ScottishPower Renewables has become one of the most popular 'eco-attractions' in Scotland, receiving 200 000 visitors since it opened in 2009. The potential visual impact of the proposed WEF on the current and future tourism operations in the study area has been raised by owners of adjacent properties. Given the nature of the

In addition to the above studies, a Property and Tourism Assessment was undertaken Urban Econ as part of the EIA for the Angora WEF located to the southwest of the town of Richmond in the Northern Cape (Urban Econ 2024). The study included a literature review of international case studies. The findings of the review indicate that there is a difference between public attitude towards clean energy in general, and opposition for development of wind energy facilities in localities that are endowed with scenic landscapes used to attract visitors to the area. Additionally, there is a divergence of views between local residents and tourists, as well as among these two groups of stakeholders which in turn, is directly linked to personal attitudes towards wind farms and perceptions. The concerns of the public with respect to the impact of wind farms on tourism stems from the attitude and perceptions by the same public that wind farms adversely impact on the valuable tourist resources or products that derive their value from visual dimension of the area and specifically the landscape (Luís Silva, 2017).

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 municipalities.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Breede Valley Municipality (BVM) within the Western Cape Province (Figure 3.1). The BVM is one of five Local Municipalities that make up the Cape Winelands District Municipality. The town of Worcester is the administrative seat of the LM.

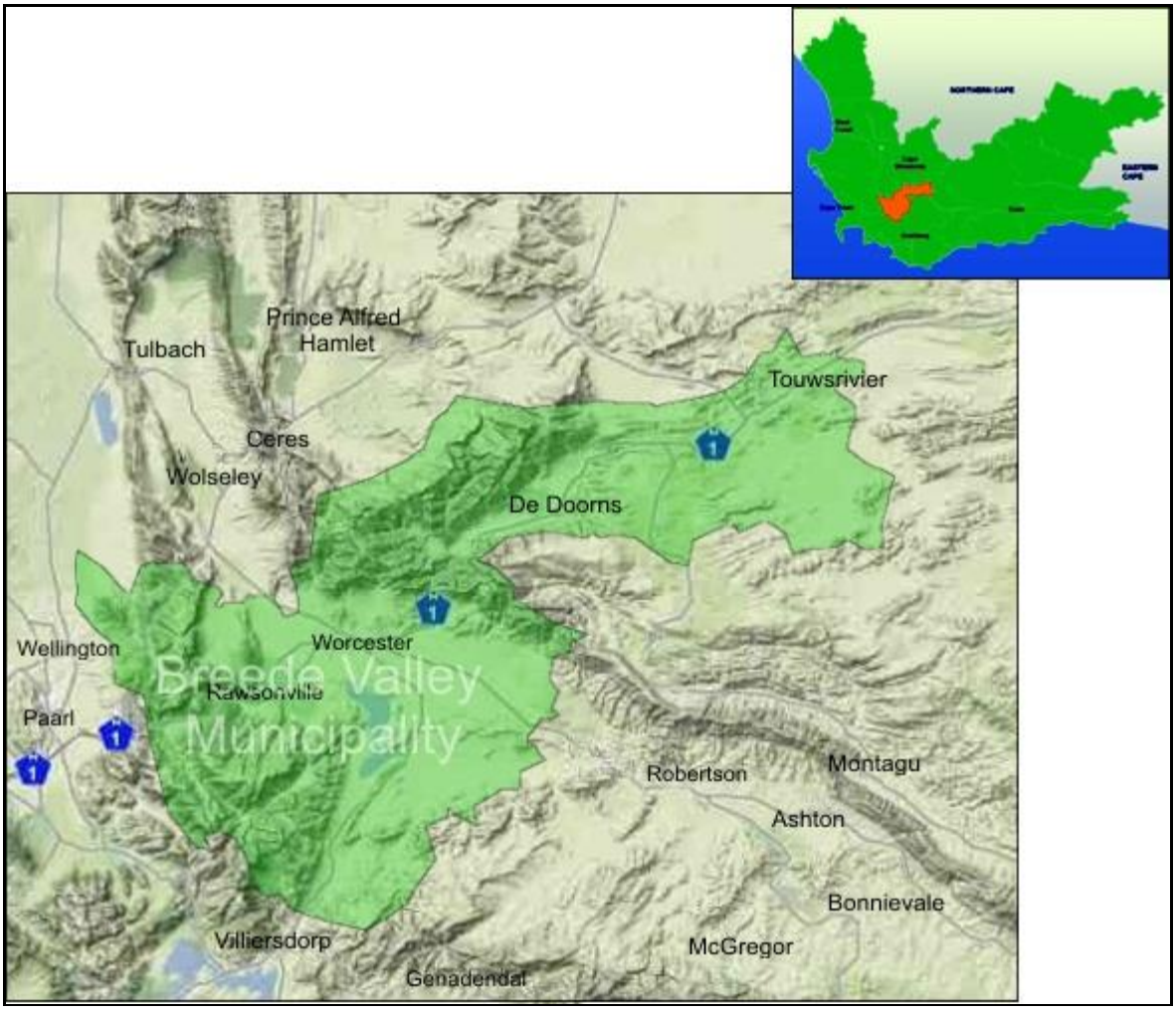


Figure 3.1: Location of Breede Vally Municipality within the Western Cape Province

3.3 DEMOGRAPHIC OVERVIEW

Population

The 2021 Socio-Economic Profile for the Breede Valley (BVM) prepared by the Western Cape Department of Social Development, indicates that the population of the BVM in 2021 was 194 555 making it the second most populated municipality in the Winelands district Municipality. The population is projected to be 200 911 by 2025 which equates to a 0.8 % annual average growth rate. Based on the 2022 Census data the population of the BVM was 212 682. The total number of households was 54 284, with an average household size of 3.9, the same as 2011.

Based on the SEP, young children under the age of 15 made up 28% of the population, the working age cohort (15-64) made up 66% and people 65 years and older made up 6%. Based on these figures the dependency ratio was 51%. Based in the data from Census 2022, children under the age of 15 made up 23.4% of the population, the working age cohort (15-64) made up 70.5% and people 65 years and older made up 6.1%. Based on this figure the dependency ratio was 41.9%. The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The difference between the 2020 SEP and 2022 Census data is therefore a concern.

The available 2022 Census data does not provide information on race groups or language. Based on the 2016 Community Household Survey Coloureds made up 64%, followed by Black Africans (22%) and Whites (13%) and. The main first language spoken was Afrikaans (77%), followed IsiXhosa (18%) by English (2%) and (Community Household Survey 2016).

Households, house types and owernship

The 2022 Census data indicates that 87.7% of the households resided in formal dwellings, compared to 77.9% in 2011. This information is worth considering within the context of the 2016 Household Community Survey which found that 70.8% of households lived in formal dwellings, while 20.4% resided in informal dwellings. The 2021 SEP for the BVM provides a figure of 76.2% for the number of formal dwellings. The significant difference between the 2022 Census results and other sources does raise concerns regarding the accuracy of the 2022 Census data, specifically give the influx of jobseekers into the area and the increase in informal settlements in and around De Doorns.

Household income

At the time of preparing the report no data on household income was available from the 2022 Census. The data is therefore still based on 2011 Census. Based on this data, 12.2% of the population of the BVM had no formal income, 1.8% earned less than R 4 800, 2.9% earned between R 5 000 and R 10 000 per annum, 14.9% between R 10 000 and R 20 000 per annum and 22.2% between R 20 000 and R 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 54% of the households in the BVM live close to or below the poverty line. The figures for the CWDM and Western Cape were 53.7% and 50.1% respectively. The low-income levels reflect the limited employment opportunities and dependence on the agricultural sector. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of

individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the LM. This in turn impacts on the ability of the BVM to maintain and provide services.

Employment

The 2021 Socio-Economic Profile for the BVM Municipality notes that the unemployment rate in the BVM has been in the region of 10% over the last 10 years and was 10.7% in 2020 (Figure 3.2). The figures are similar to those for the WDM and lower than provincial figures over the same period. The figure for the Western Cape in 2020 was 18.9%.

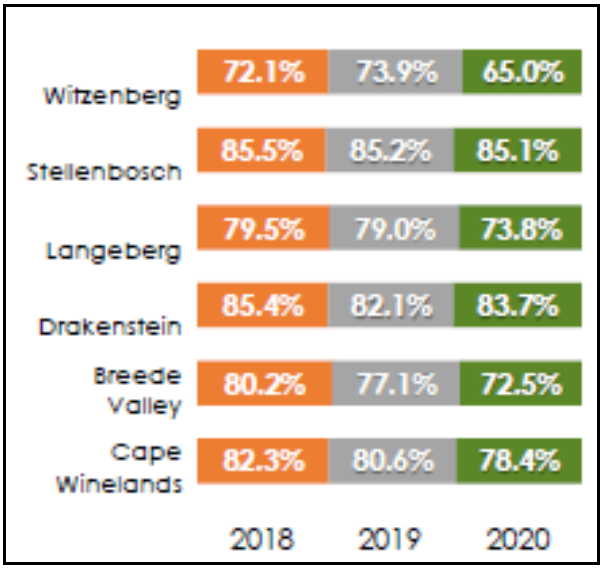
Unemployment rates	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Drakenstein	13.1	13.4	13.1	12.7	13.1	12.1	13.1	13.7	13.6	14.5	14.1
Langeberg	6.4	6.6	6.5	6.2	6.5	5.6	6.4	6.7	6.7	7.3	7.3
Stellenbosch	9.8	10.1	10.0	9.7	10.1	9.3	10.3	10.7	10.7	11.6	11.3
Witzenberg	7.3	7.4	7.1	6.7	6.9	5.9	6.4	6.7	6.6	7.1	6.9
Breede Valley	**10,3**	**10.6**	**10.3**	**9.8**	**10.2**	**9.1**	**10.0**	**10.4**	**10.3**	**11.1**	**10.7**
Cape Winelands	10.1	10.3	10.1	9.7	10.0	9.1	10.0	10.4	10.3	11.1	10.8
Western Cape	15.9	16.1	16.1	16.0	16.4	16.5	17.7	18.4	18.3	19.6	18.9

Source: SEP BVM 2021

Figure 3.2: Unemployment rates for Breede Valley Municipality

Education

Based on the information contained in the SEP, the matric pass rate in the BVM was 72.5% in 2022, down from 77.1% in 2019 and 82.3% in 2018. After the Witzenberg Municipality, the BVM had the lowest matric pass rate in the WDM (Figure 3.3)



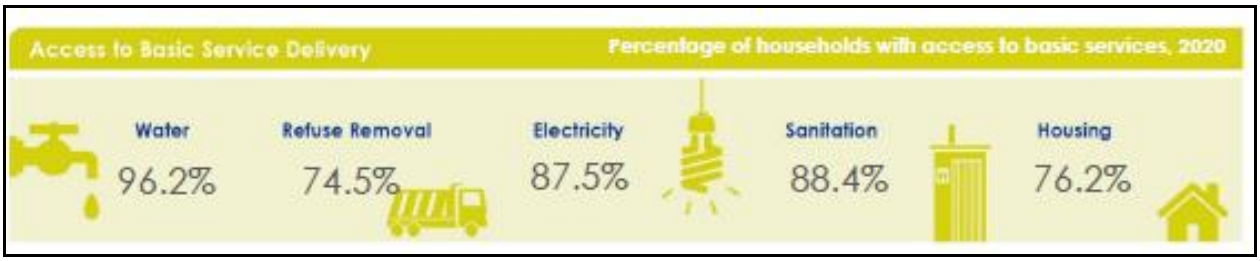
Source: SEP BVM 2021

Figure 3.3: Matric pass rates for BVM and CWDM

3.4 MUNICIPAL SERVICES

Based on the information from the 2022 SEP 87.5% of households in the BVM had access to electricity, 96.2% had access to water, 88.4% had access to sanitation services, and 74.5% had their refuse removed on a regular basis (Figure 3,4). In summary, service levels in the BVM can be described as good.

The figures from the 2022 Census indicate that 97.2% have access to electricity, 84.7% access to piped water, 94.9% are connected to sewage, and 83.4% have access to weekly refuse collection services. Once again, the Census figures are significantly better than the 2021 SEP figures. This raises concerns specifically given the relatively high number of informal dwellings in the BVM.



Source: SEP BVM 2021

Figure 3.4: Summary of municipal services

3.5 HEALTH AND EDUCATION FACILITIES

Education facilities

Based on the 2021 SEP there are 58 schools in the BVM, of which 46 (79%) are no-fee schools. This reflects the low income levels in the area. Less than 50% of the schools, (46%) are equipped with libararies.

Health care facilities

Access to healthcare services is a basic human right and one that is directly affected by the number and spread of facilities within their geographical area. In terms of healthcare facilities, there is 1 regional hospital in the BVM (Worcester), 1 Community Day Centre, 9 PHC Clinics (Satellite and Mobile) and 6 fixed PHC Clinics.

Child health is a key indicator of well-being and potential needs. The United Nations Sustainable Development Goals (SDGs) aim to end preventable deaths of new-borns and children under 5 years of age by 2030, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1 000 live births and under-5 mortalities to at least as low as 25 per 1 000 live births (Source: UN SDG's). Key criteria used to measure child health include immunisation rates[13], percentage of malnourished children[14], neonatal

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

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

mortality rate[15] and birth weight[16]. The immunisation coverage rate for children under the age of one in the BVM was 58.2% compared to 60.6% for the CWDM. These rates are low compared to other areas, for example the Central Karroo District was 71.3% in 2018/19. The number of malnourished children under five years (per 100 000) in 2021 was 1.6, while the neonatal mortality rate (NMR) (deaths per 1 000 live births before 28 days of life) was 20.1 and the low birth weight was 19.7, compared to 15.5 and 10.7 for the CWDM. The child health care conditions in the BVM are therefore poor compared to the district.

3.6 ECONOMIC OVERVIEW[17]

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

Economic sectors
In terms of key sectors, the local economy in the BVM was dominated by the tertiary sector which contributed 69% towards the Gross Domestic Product for the Region (GDPR)[18] in 2019, followed by the Secondary Sector (21%) and the Primary Sector (10%) (Figure 3.5). Within Tertiary Sector, the most important subsectors were Finance, insurance, real estate and business services (21% towards GGDP) and Wholesale and retail trade, catering and accommodation (19% towards GGDP), each contributing more than the entire Primary Sector. The Agriculture, forestry and fishing subsector within the Primar Sector contributed 9% towards GGDP.

Employment
In terms of employment, the Tertiary Sector was made up 64% of all jobs in 2019, followed by the Primary Sector (24%) and the Secondary Sector (12%) (Figure 3.5). However, in terms of subsectors the Agriculture, forestry and fishing sector was the most important sector in 2019, making up 23.5% of all jobs, followed by Wholesale and retail trade, catering and accommodation (22%), and Finance, insurance, real estate and business services (16%). The COVID-19 pandemic is likely to have resulted in job losses during 2020, extending into 2022/23.

In terms of skills levels, the labour forces in the BVM in 2020 consisted mainly of low-skilled (41%), followed by semi-skilled (40.3%) and skilled (18.7%) workers. The high percentage of low and semi-skilled workers is linked to the agricultural sector.

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[15] **Neonatal mortality rate:** *Measured as the number of neonates dying before reaching 28 days of age, per 1 000 live births in a given year.* The first 28 days of life (neonatal period) represent the most vulnerable time for a child's survival. The Province's target for 2019 is 6.0 per 1 000 live births.
[16] **Low birth weight:** *Percentage of all babies born in facility that weighed less than 2 500 g.* Low birth weight is associated with a range of both short- and long-term consequences.
[17] Information on the local economy is based on the 2021 Socio-Economic Profile of the BVM prepared by the Western Cape Provincial Government.
[18] Gross domestic product of a region (GDPR) is the standard measure of the value added created through the production of goods and services in a region (the LM) during a certain period.

	SECTOR	GDPR			Employment		
		R Million value 2019	Trend 2015 –2019	Real GDPR growth 2020e	Number of jobs 2019	Average annual change 2015 - 2019	Net change 2020e
PS	**Primary Sector**	**1 228.5**	**-3.9**	**10.6**	**20 211**	**364**	**-851**
	Agriculture, forestry & fishing	1 199.7	-3.9	11.2	20 177	365	-848
	Mining & quarrying	28.8	-0.3	-18.6	34	-1	-3
SS	**Secondary sector**	**2 841.7**	**0.6**	**-11.5**	**10 300**	**142**	**-902**
	Manufacturing	1 834.5	0.7	-9.0	6 046	52	-399
	Electricity, gas & water	262.9	-2.9	-8.4	176	-1	-7
	Construction	744.2	1.6	-19.9	4 078	91	-496
TS	**Tertiary sector**	**9 230.9**	**2.1**	**-5.5**	**55 256**	**1 412**	**-2 953**
	Wholesale & retail trade, catering & accommodation	2 560.9	1.8	-9.8	18 682	646	-1 180
	Transport, storage & communication	1 419.7	0.8	-15.2	3 298	86	-118
	Finance, insurance, real estate & business services	2 747.4	4.4	-1.7	14 024	538	-531
	General government	1 394.5	-1.0	-1.0	6 888	- 71	15
	Community, social & personal services	1 108.3	1.1	-2.5	12 364	214	-1 139
	Breede Valley	**13 301.0**	**1.0**	**-4.9**	**85 767**	**1 917**	**-4 706**

Source: SEP BVM 2021

Figure 3.5: Summary of GDPR and Employment for BVM

3.7 OVERVIEW OF STUDY AREA

3.7.1 Introduction

The Hugo WEF site is located in the central portion of the Breede Valley Municipality (BVM) in the Cape Winelands District Municipality (Figure 3.6). The study area is rural. Worcester, located approximately 27 km[19] south-west of the site, is the seat of the BVM and the nearest large town in the region. Other settlements in the BVM include the small towns of Rawsonville, De Doorns, and Touwsrivier. The site is located approximately 7 km east of De Doorns, and approximately 15 km south-west of Touwsrivier. De Doorns and the broader Hex River Valley are a major producer of table grapes for the national and export markets. The site is located just north of the boundary with the Langeberg Municipality (LM). Montagu, the nearest town in the LM is located approximately 41 km (linear) south-east of the site. The important stone fruit farming and agri-tourism Koo region is located to the south of the Waboomsberge, midway between the site and Montagu.

[19] All distances linear.

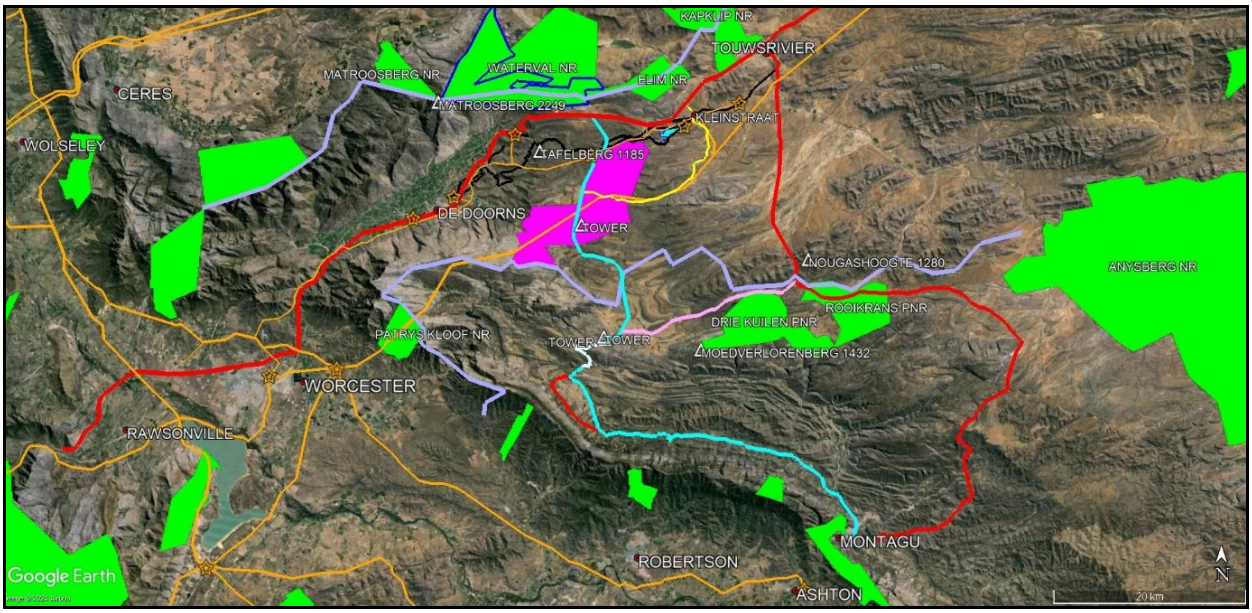


Figure 3.6: Hugo WEF site (pink fill) in relation to BVM boundary (grey), settlements, protected areas (green fill; world heritage site blue outline[20]), railway lines (black), Eskom lines (orange), operational Touws River PV (light blue fill), and key study area roads: red, R318 (light blue line, Rooihoogte Pass white), Nougaspoort road (light pink), and Kleinstraat road (yellow)

Primary access to the study area is via the R318 ('Koo Road') which links the N1 to the north of the site to Montagu via the Rooihoogte Pass and the Koo to its south. The R318 intersection is located approximately 7 km east of the top of the Hex River Pass on the N1 (Photograph 3.1). The site is located approximately 4 km south of N1 and straddles the R318. The R318 is identified as a scenic road in the BVM SDF, and by Hex River Valley Tourism and Touwsrivier Tourism. The scenic Rooihoogte Pass (LM) is located approximately 11 km to the south of the site. Due to mountainous terrain (Kwadouwsberg, Langeberg), there are no public road links to the west. Robertson and Ashton south of the Langeberg are only accessible via Montagu. The R318 intersects with the R62 in Montagu. The R62 forms part of the well-established Route 62 tourism route, in its expanded form now stretching between Cape Town and Gqeberha[21]. The R318 functions as a link between the N1 and the R62 corridor.

[20] Based on DFF&E's Register of Protected Areas, Western Cape Department of Agriculture Cape Farm Mapper, and input from Drie Kuilen PNR. Mountain Catchment Areas not indicated.
[21] https://www.route-62-info.co.za/routes

Photograph 3.1: Intersection of N1 and R318

Two east-aligned roads are of relevance, namely the 'Kleinstraat road' and the Nougaspoort road. The Kleinstraat road is a minor public road which curves north to intersect with the N1 near Kleinstraat siding ('Kleinstraat road'). The road primarily serves as access to local farms, namely Nadini (site), Ratelbosch, and Skulpiesklip. Entrance to the road is controlled by a farm gate (Photograph 3.2). The Nougaspoort public gravel road, which intersects with the R381 approximately 10 km to the south of site, links the R318 to a public gravel road which links Touwsrivier to Montagu further to the east (Photograph 3.3). Several study area tourism operations gain access off the Nougaspoort road, e.g. Eximia, Leeuwenboschfontein, Drie Kuilen and Gecko Rock.

Photograph 3.3: 'Kleinstraat' road near the R318 intersection

Photograph 3.3: Intersection of R318 and Nougaspoort road.

Existing service-industrial infrastructure in the study area is limited and relatively confined to the N1 and surrounds. Telecom towers are located on two prominent hills along the R318, one on the Hugo site, and the other at the crest of the Rooihoogte Pass. The microwave relay tower on the Hugo site is much higher than the surrounding terrain, and only visible across longer sight distances (Photograph 3.4). Two old railway lines on the De Doorns-Touwsrivier railway route traverse the northern portion of the site property Helpmekaar 148/9. While decommissioned, rail cuttings have remained visible, also from the R318 (Photograph 3.5). The old Matroosberg railway siding is located 750 m to the west of the R318 (and the site).

Photograph 3.4: Microwave relay tower on Stinkfonteinsberg (147/RE) to the east of the R318. Vredelus farmyard on Stinkfontein 172/RE in the middle distance

Photograph 3.5: Railway line cutting between Matroosberg siding and R318 to the west of the site

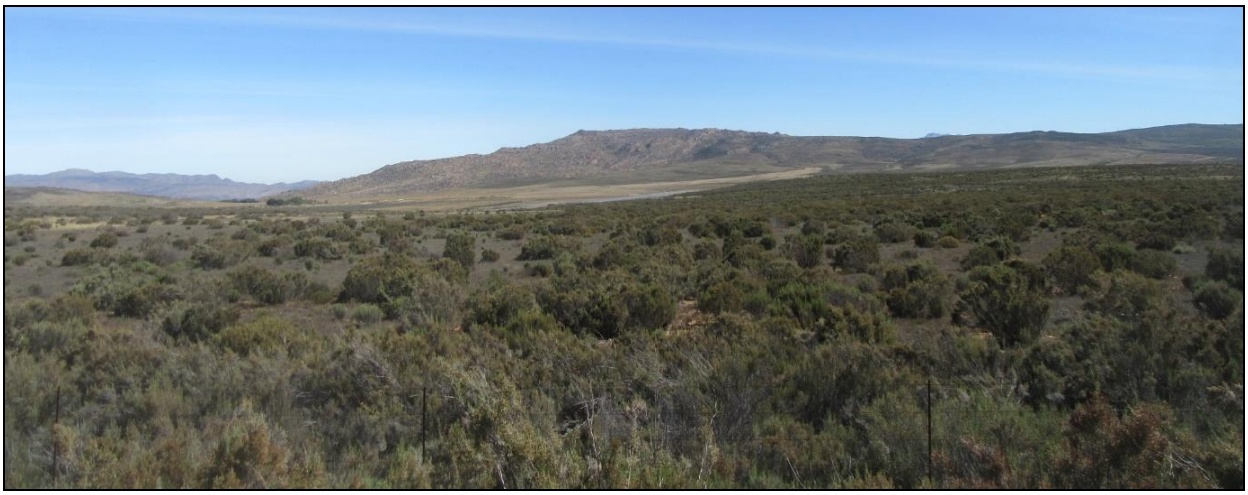
Two existing Eskom line corridors traverse the site. Both cross the R318. Two 66 kV lines are aligned near-parallel to the old rail corridor, feeding into a small substation outside Matroosberg siding (Photograph 3.6). Two 132 kV lines near-parallel 5 km to the south traverse the central and southern portions of the site (Photograph 3.7). The small operational Touws River CPV Solar facility is located approximately 1.3 km to the north-west of the site, between the old railway lines and the N1 (Photograph 3.8). A car junk yard is located between the N1 and the facility. Power is evacuated into the national grid via an on-site substation to the beforementioned 132 kV lines.

Photograph 3.6: Small substation near Matroosberg siding.

Photograph 3.7: 132 kV lines crossing the R318 on Stinkfontein Berg 147/RE (Hugo site)

Photograph 3.8: Operational Touws River Solar PV seen from N1

The site is located in an area known as the Agterveld ('back veld') or Hoëveld ('high veld'). These names reflect the study area's elevated location relative to the Hex River Valley to the west and the Koo Valley to the south. The study area is enclosed by mountainous terrain associated with the Kwadouberg and Langeberg to the west and south-west, and the Waboomsberge to the south. The terrain is mountainous to gently undulating, but also includes broad valley floors (Photograph 3.9). The Hex River range and the prominent Matroosberg north of the Hex River Valley are visible in much of the immediate study area.



Photograph 3.9: Veld on southern portion of Stinkfontein 172/RE

The study area is arid, with a mean annual rainfall of 200-300 mm, most of which falls in winter. The Waboomsberge are well known for their snowfall in cold years. The study area is often referred to as 'Karoo' but is actually at the interface of the Fynbos and Succulent Karoo biomes. Three main vegetation types are represented, namely Sandstone Fynbos on mountainous terrain to the west (Kwadouwsberg) and south (Waboomsberge) of the site, Succulent Karoo in the northern Hex River Valley and south of Touwsrivier, and broad bands of Shale Renosterveld flanking the R318 and Nougaspoort road (Photograph 3.10). The site and adjacent properties are dominated by renosterveld. The study area vegetation is characterized by the absence of a natural tree component.

Photograph 3.10: Renosterveld on Helpmekaar 148/9 (Hugo site)

Formally protected areas and private conservation areas within 15 km of the site are located to the north-west (Matroosberg Nature Reserve (NR)), north (Waterval/ Bokkerivier Private Nature Reserve (PNR)), north-east (Elim PNR), and Kapklip NR), south-east (Drie Kuilen PNR), south (Doornkloof PNR) and south-west (Patryskloof PNR)[22]. Waterval/Bokkerivier and Elim are the nearest, namely 5 km and 4.5 km, respectively. The southern portion of

[22] https://egis.environment.gov.za/protected_and_conservation_areas_database

Waterval (fronting onto the site) forms part of the Cape Floral Region Protected Areas serial World Heritage Site. At least two further informal private nature reserves are located within 15 km of the site, namely Eximia Private Game Reserve (being established) along the Nougaspoort road, and Matroosberg PNR across the R318 from the site.

The study area economy and land use are traditionally based on agriculture. Primary agriculture is however on the decline, making place for lifestyle and weekend farming, conservation, and nature-based tourism. Current agricultural activities are largely based on raising livestock, but also includes limited cropping. Sheep, goat, and cattle are kept (Photograph 3.11). Veld carrying capacities (grazing potential) are low to very low, ranging from 1 Large Animal Unit (LSU) per 54 ha on Little Karoo veld, to 1: 72 on shale renosterveld (site and surrounds) to 1: 108 on the sandstone fynbos[23]. While livestock is associated with most study are properties, stock theft is not currently considered problematic. This is linked to the relative isolation of the study area, low stocking concentrations, and limited public access roads. Security cameras are located at various points along the R318. Access to various individual properties is controlled.

Photograph 3.11: Cattle grazing on Ratelbosch 149/6 along the R318

Dryland cereal cropping is confined to broad valley floors on renosterveld shale soils. The study area is a marginal cereal cropping area, with average harvests around 1 ton/ ha. Dryland cropping has been abandoned or reduced on many properties and is currently concentrated in the area just to the north of the Rooihoogte Pass. Irrigated cropping is confined to modest plantings of vegetable seed, fodder crops, vegetables, and stone fruit (mainly apricot). Given the nature of operations, few permanent employment opportunities are associated with study area agriculture.

As indicated, conservation and tourism are becoming important land uses in the study area. In many instances, tourism and farming uses are combined to varying extents, while a few are primarily focused on eco-/ wilderness tourism in a conservation setting. Several natural protected areas, mainly privately owned, are located in the broader study area. Although the study area is topographically screened and separated from the nearby Hex River Valley, it is considered part of the Touwsrivier Tourism area and marketed as such. Study area tourism primarily caters to the 'breakaway' urban Cape Town and Boland-based urban market, supplemented by international visitors (mainly Aquila and Inverdoorn) and

[23] https://gis.elsenburg.com/apps/cfm/

overnight stays associated with travellers on the N1 (mainly but not exclusively on operations adjacent to or near the N1).

The study area is marketed as the nearest/ most accessible bit of 'Karoo' relative to the urban Cape. The key anchoring attractions include the scenic setting, wilderness qualities, the quiet, and the starry night skies. Both the natural environment and 'Karoo farm experience' qualities are emphasized. Due to low carrying capacities, the study area is not ideal for hunting-based operations. No commercial (paying) hunting is associated with the immediate study area[24]. Primarily game viewing/ safari tourism is limited to Aquila north of the N1 (see further below), and Njalo Njalo Safari south of Touwsrivier. Local operations benefit from spillovers from Aquila, and some in return offer tie-in safari excursions to Aquila to their guests. An overview of key tourism receptors on site-adjacent and near-adjacent properties is provided below.

As indicated, the R318 links the N1 corridor to the important tourism town of Montagu via the scenic Koo Valley, and from Montagu to Route 62. Of direct relevance are tourism operations along the Nougaspoort Road and in the Koo Valley to the south of the site. Several large established (and being established) primary tourism or mixed farming/ tourism receptors are located along the Nougaspoort road and are almost exclusively accessed via the R318. These include Eximia, Leeuwenboschfontein, Drie Kuilen and Gecko Rock. The scenic fruit-faming Koo to the south of the Waboomsberge, is a well-established agri-tourism destination. Numerous farm stay accommodation facilities are offered in the Koo Valley. Langdam is popular wedding venue. Protea Farm is well-known for its tractor rides on the northern slopes of the Langeberg. All the Koo receptors are directly or indirectly accessed off the R318. Fruit farms in the Koo make use of the road to move their product to the N1 corridor. These receptors are sensitive to construction traffic impacts on the R318.

3.7.2 Site properties

The Hugo site consists of 6 properties, Oudekraal 145/RE, Stinkfonteins Berg 147/RE, Helpmekaar 148/9[25], Stinkfontein 172/RE, Farm 173 and Farm 174/2 (Figure 3.7). No infrastructure is proposed on 145/RE. Turbines are proposed on all five other properties, but are concentrated on 147/RE, 148/9 and 174/2. The preferred substation, BESS, O&M and construction laydown terrains cluster site is located on 147/RE, approximately 230 m west of the R318, near the WEF site boundary. The alternative site is proposed to the east of the R318, just to the north of the T-junction with the Kleinstraat gravel road. Site access is proposed directly off the R318. Five to six (including substation complex alternatives) access points are proposed. A short portion of the Kleinstraat road will also be affected.

[24] The operation on Hartebeeskraal south of the N1 near Kamagu Lodge has recently closed down (Lynton X, pers. comm).

[25] Helpmekaar 148/9 effectively consists of 3 separate parts separated by two rail parcels. Development is only proposed on the large southern part (EIA site), south of the southernmost railway line. The whole property extent is indicated in Figure 3.7.

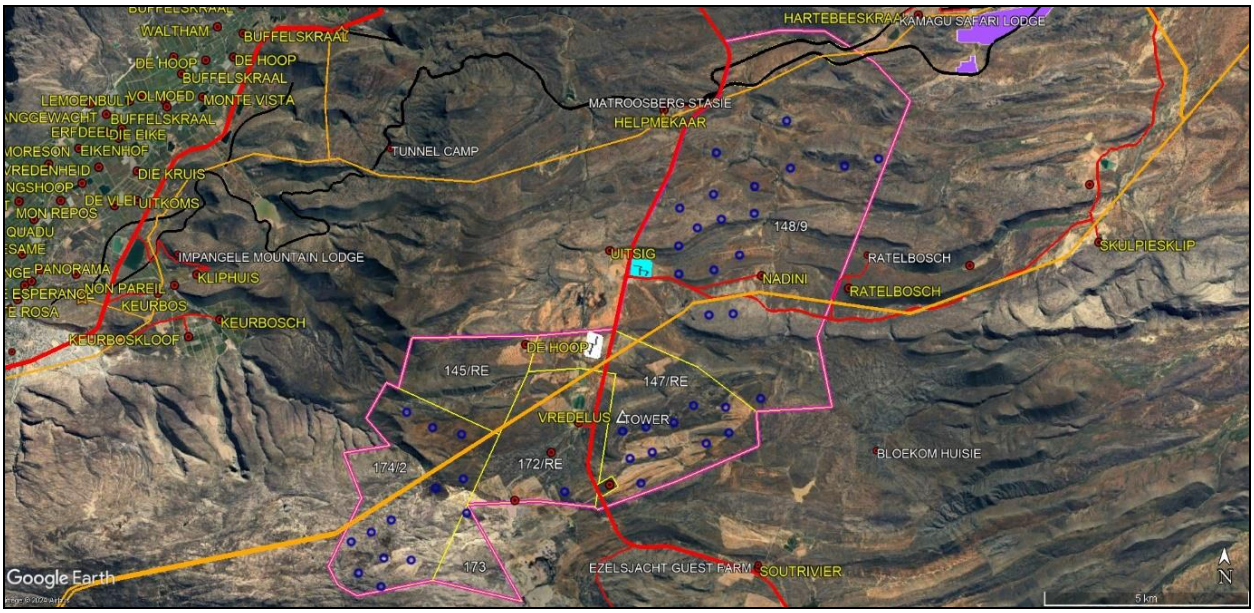


Figure 3.7: Hugo WEF site (pink) and constituent properties (yellow) in relation to proposed infrastructure: turbines (blue circles), and construction and operational terrains cluster Preferred (white fill) and Alternative (blue fill) sites. Also indicated are key roads (red), railway lines (black), Eskom lines (orange), and operational Touws River PV (purple fill)

Helpmekaar 148/9 is owned by Mr Dirk Uys. The other five properties belong to the Hugo family. Mr Uys resides on 148/9 ('Nadini') (Photograph 3.12). Mr Uys is retired and uses the property as a lifestyle farm. A sheep farming operation matched to sustainable natural carrying capacity of the property is being developed. Internal fencing has been removed on the 4018-ha property. No cropping activities, tourism or hunting is associated with the property. The northern portion of 148/9 is affected by decommissioned railway lines and an Eskom distribution line corridor, and the southern by a 2 x 132 kV transmission line corridor. A private landing strip to the north of Nadini farmstead has been deregistered and is no longer in use. No tourism is associated with the property.

Photograph 3.12: Nadini farmstead on Helpmekaar 148/9

The owners of the Hugo properties do not reside in the study area. Stinkfontein 172/RE ('Vredelus') serves as base farm (Photograph 3.13). Sheds and outbuildings are located on

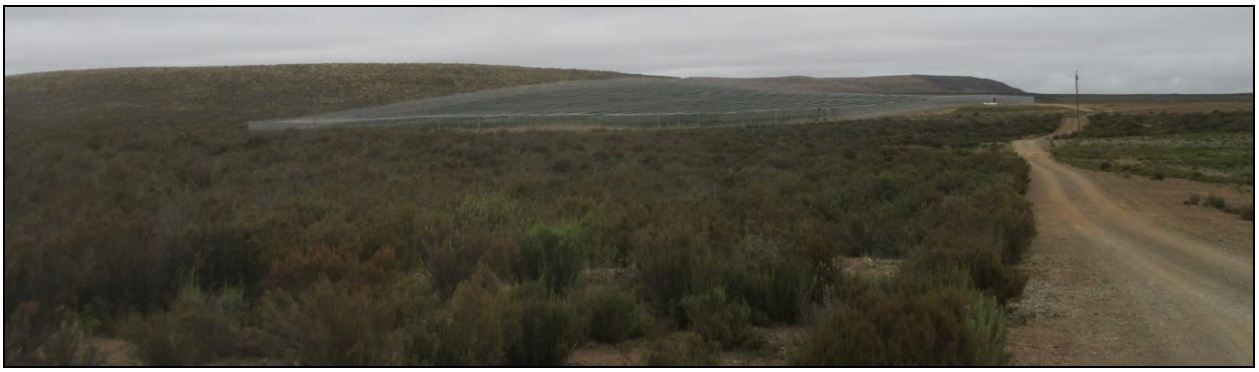
the yard. The farm manager resides in Vredelus farmstead. Workers houses are located on the southern periphery of the yard (Photograph 3.14).

Photograph 3.13: Vredelus farmyard on Stinkfontein 172/RE

Photograph 3.14: Farm workers' houses on Stinkfontein 172/RE

The properties are farmed as Vredelus Farm and include site adjacent Ezelsjacht 171/1 to the south. The farming operation is based on livestock, irrigated fodder cropping and the cultivation of apricots (Photograph 3.15). Cropping activities are concentrated on 172/RE. Modest blocks of apricots are grown under shade netting on 172/RE and 171/1 (Photograph 3.16). No tourism is associated with the estate. Service-industrial infrastructure is currently limited to the microwave relay tower on top of Stinkfonteinsberg (172/RE) along the R318, and the 2 x 132 kV corridor which traverses portions of 4 of the Hugo properties, effectively bisecting the estate. The corridor is located approximately 900 m north of the Vredelus farmstead.

Photograph 3.15: Sheep grazing on Stinkfontein 172/RE.



Photograph 3.16: Apricots grown under shade netting on Stinkfontein 172/RE.

No layout issues have been raised by the two landowners. The access road to Vredelus (172/RE) will not be affected. The access road to Nadini (148/9) will be affected over a relatively short distance, and only for access to a small portion of the project. Turbine footprints would affect veld used for limited grazing on 148/9. Footprints on the Hugo properties would affect veld and abandoned dryland cropping areas. Turbine locations are not considered visually intrusive on residential receptors on 148/9 (Uys) and 172/RE (Hugo). The proposed turbine layout is acceptable to both landowners. The owner of 148/9 has indicated that the northern portion of his property near the old railway lines has the capacity to accommodate more turbines. The substation complex sites are both acceptable to the relevant owners. Both are in peripheral locations and not in meaningful proximity to the relevant farmyards. Both would affect degraded veld (historic dryland cropping areas) (Hugo, Uys, pers. comm).

3.7.3 Adjacent properties

The site properties border onto 21 properties (excluding rail parcels). The properties are used for farming, conservation, and tourism purposes. Farming activities include the raising of livestock and modest cultivation of irrigated fodder crops, vegetable seed, vegetables, and fruit crops. Large parts of adjacent properties, especially to the south-west and south, consist of mountainous terrain. Properties to the extreme west of the site front onto the Hex River Valley and are accessed off the N1 (Figure 3.8).

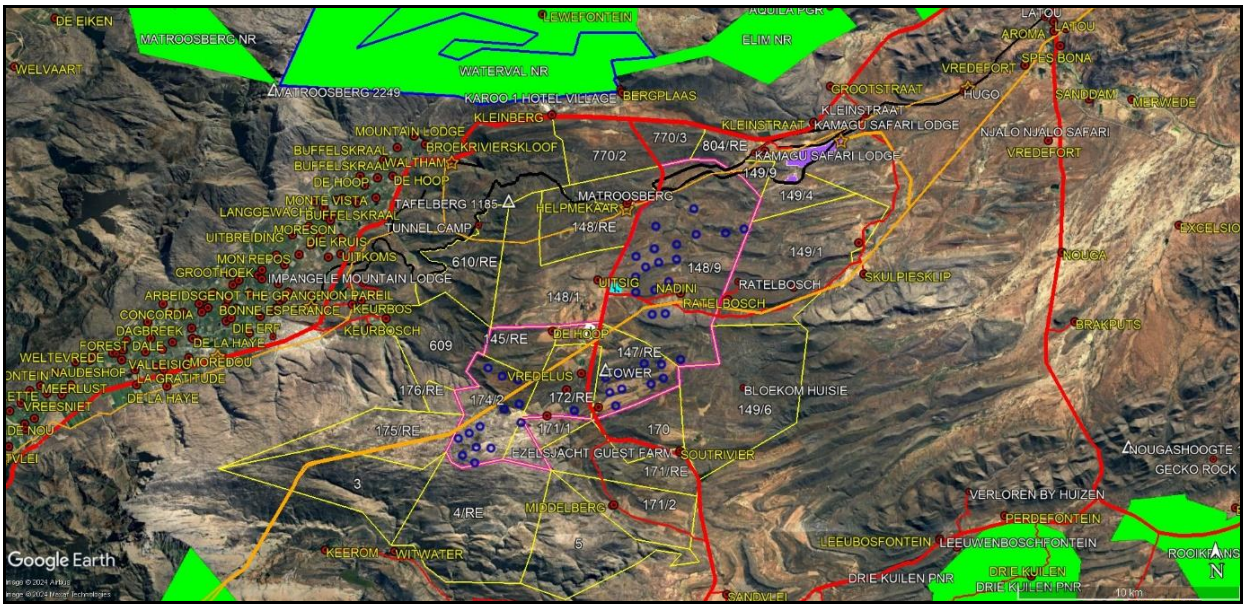


Figure 3.8: Hugo WEF site (pink) and proposed infrastructure in relation to adjacent properties (yellow) and farmsteads: turbines (blue circles), construction and operational cluster sites: Preferred (white fill) and Alternative (light blue fill). Also indicated are public and access roads (red), protected areas (green fill; world heritage site dark blue outline), railway lines (black), Eskom lines (orange), and operational Touws River PV (purple fill)

Residential and tourist accommodation receptors are associated with 6 directly adjacent properties, namely Ratelbosch 149/1 (Ratelbosch farmyard and tourist accommodation), Ratelbosch 149/6 (Bloekom Huisie cottage), Ezelsjacht 171/RE (Zoutrivier yard, Ezelsjacht Guest Farm), Ezelsjacht 171/2 (Middelberg Guest Farm and Camp Site), Dennegeur 609 (Keurbos farmyard), Helpmekaar 148/1 (Uitsig farm yard), Helpmekaar 148/RE (Helpmekaar farm yard, and Matroosberg Station node). In addition, several non-adjacent key tourism operations are located within 10km of the site. An overview of key adjacent and near-adjacent receptors is provided below.

Karoo1 Village

Karoo1 Village is located to the north of the N1. The estate entrance is across the road from the N1/ R318 T-junction. The estate stretches to the west (top of Hex River pass) and east (Touws River Solar), and is located north of the N1, i.e. does not border directly onto the site. Karoo1 is nevertheless a large receptor and in significant proximity to the site (Photograph 3.17).

Karoo1 offers various accommodation options and an event venue, all located around the original Bergplaas farmyard approximately 1.2 km north of the N1. Africamps offer luxury tent accommodation in a kloof just to the north of the yard. Karoo1 caters to travellers on the N1, breakaway tourism, and weekend weddings. It offers tie-in safari day trips to Aquila to its guests.

The owner has indicated that the proposed development was unlikely to have a significant visual and sense of place on receptors on Karoo1. This is linked to proximity of the N1, topographical screening, and acceptable distance to proposed turbines (>6 km). The owner has expressed interest in accommodating a WEF or SEF on his property. The owner also

identified an opportunity to provide accommodation during the construction phase. The only concern raised relates to the management of access to the property and traffic flows around the R318/ N1 T-junction during the construction phase (Howard, pers. comm).

Photograph 3.17: Entrance to Karoo 1 Village off the N1(to the north of the N1)

Aquila Private Game Reserve

Aquila PGR is located to the north-east of the site, between the N1 and the Verkeerdevlei Dam, and includes the Elim Private Nature Reserve. Aquila is accessed off the R46 (N1 to Ceres or Karoopoort). Aquila and Inverdoorn PGR (near Karoopoort, now also part of the Aquila Collection) are well-established as the nearest 'Big-5' safari destinations to Cape Town. The key target market are international travellers with limited time to spend on a safari excursion. Aquila caters for day trips and upmarket overnight accommodation. Fly-in and shuttle options from Cape Town International are available. Many tourism operations in the study area provide link-ins (safari packages) with Aquila, or otherwise list Aquila as a key local attraction in their marketing. Some interviewees indicated that they frequently benefit from overflows or spinoffs from Aquila.

The large built cluster (old Elim farmyard) straddles the R46 and is located in a valley, enclosed by mountainous terrain. It includes accommodation, reception, and the main entrance. It is located 10.5 km from the nearest turbine. The boundary of Elim PNR is 6.5 km from the nearest turbine. Significant direct impacts on Aquila are therefore unlikely.

Kamagu Safari Lodge

Kamagu Lodge is located along the N1 in the immediate vicinity of Touws River PV facility. Kamagu was recently acquired by the Aquila Collection (5 linked operations). The lodge on Karbonaatjieskraal 38/3 (an old rail siding) was established as a 'Karoo farm experience' breakaway-based operation, and before that, a commercial hunting operation. The original lodge is located to the south of the N1. The main entrance is to the north of the N1 (Kleinstraat farm) (Photograph 3.18). The extent of the Kamagu property could not be established, but it appears to form part of a larger estate (same ownership) which includes the Touws River Solar and Kleinstraat farm properties and extending to (and including) Aquila PNR. The estate is understood to border directly onto the northern boundary the northernmost part of Helpmekaar 148/9 (site property).

Photograph 3.18: Entrance to Kamagu Lodge off the N1 (north of the N1)

Kamagu Safari Lodge (south of the N1) offers luxury self-catering accommodation in a 'working Karoo farm' setting and accommodates 21 guests. Vegetables, fruit and olives are grown on the property, and guests are given the opportunity to pick their own produce. Kamagu has a private landing strip (north of the Touws River PV site) and offers tie-in safari day trips to Aquila. The nearest turbines are proposed approximately 3.5 km south of the Lodge, and ~5.7 km south-west of the Kleinstraat farmyard. Visual impacts may therefore occur. However, both receptors are located in a moderately disturbed context (N1, railway lines, Touws River PV plant). Kamagu is physically separated from the site by the old railway lines and accessed from the N1, and thus unlikely to be directly affected by construction phase impacts.

Ratelbosch Guest Farm

Ratelbosch Guest Farm is located on Ratelbosch 149/1 adjacent to the east of the site. The property straddles the Kleinstraat gravel road. The owner resides on the property. The farmstead is located to the north of the road, approximately 300 m to the west of the site, but is screened from the site by topography. The property is currently used for farming (livestock, irrigated fodder crops and vegetable seed), but the owner is in the process of reviving a guest accommodation facility (Ratelbosch cottage) and establishing a paying hunting destination, both focusing on the Cape and Boland urban market. The Ratelbosch facility is in a valley, and also benefits from screening. The nearest turbines are proposed 2.5 km from the facility, and 200 m from the property boundary.

The owner has indicated that the proposed layout was likely to be acceptable (as receptors are screened), but this would need to be confirmed by the Visual and Noise studies. The proposed hunting activities would be set up to account for safety setbacks (i.e. restricting shooting to the west), and no impacts on the feasibility of the venture are anticipated (Bester, pers. comm). Alternative property access is feasible from the Kleinstraat side of the Kleinstraat road to mitigate construction phase traffic impacts.

Ezelsjacht Guest Farm

Limited information could be sourced for Ezelsjacht Guest Farm. The Ezelsjacht estate is comprised of four properties, De Braak 7/1, Ratelbosch 149/6, Zout Rivier 170, and Ezelsjacht 171/RE. The three latter properties are located adjacent to the south-east of the Hugo site. Two Mainstream renewable energy projects are currently proposed on the property, namely the 110 MW Ezelsjacht Solar PV on 149/6, and the 140 MW Ezelsjacht WEF on all four of the properties. The owner does not reside on the property. In as far as

could be established, the properties are used for livestock farming and modest plantings of irrigated fodder crops and possibly vegetable seed. Tourist accommodation appears to be located on the Zoutrivier yard on 171/RE, adjacent to the R318 (Photograph 3.19). The farmstead is located 3.2 km to the south of the nearest proposed Hugo turbine. A tourist accommodation cottage (Bloekom Huisie) is located 4 km to the north of the yard, approximately 650 m east of the proposed Mainstream PV development area, and approximately 3.1 km east of the nearest proposed Hugo turbine.

Photograph 3.19: Entrance to Zoutrivier farmyard and Ezelsjacht Guest Farm off the R318

Middelberg Guest Farm

Middelberg Guest Farm is located adjacent to the south-east of the site. The Middelberg estate consists of Farm 5 and Ezelsjacht 171/2, both sharing the same point boundary (single beacon) with the site. Middelberg is accessed off the R318. The access road loops out of and back into the R318 across the property, with the main entrance from the north. Middelberg is used for secondary (weekend) farming and tourist accommodation. The Middelberg farmstead (171/2) is occupied by the owner over weekends. Two tenured worker households are associated with the estate. Farming activities focus on livestock and vegetable seed cultivation.

The tourism operation is targeted at the Cape urban breakaway market and school groups. Die Koshuis, a facility with 40 bunk beds and other amenities, is located on the yard (171/2). A self-catering guest cottage (10 beds) is located ~110 m to the west of the farmstead (Photograph 3.20). A small camp site (6 stands) is located in the northernmost corner of the estate, near the Hugo site boundary. Guest flows are mainly over weekends and year-round. Average occupation is 3 out of every 4 weekends.

Key attractions are considered the 'working Karoo farm' setting, the natural veld, and the starry night skies. The key viewshed from the yard and cottage is to the south-east, i.e. away from the Hugo WEF site. The camping site is however exposed to the site. The nearest turbine is proposed 2.6 km north of the site. The owner raised concerns about potential visual and sense of place impacts on Middelberg, and specifically the camp site (Havinga, pers. comm).

Photograph 3.20: Middelberg guest house on Ezelsjacht 171/2.

Uitsig farm

Helpmekaar 148/1 is located across the R318 from the site (148/9). The farmyard (Uitsig) is located ~500 m west of the R318. The owner is based outside the study area. The farmstead is occupied over weekends and holidays by the owner and private guests. The operation is based on raising livestock and the cultivation of fodder crops. No tourism is currently associated with the property, but the owner contemplates the development of a camping site and mountain bike route. The property is not affected by railway lines or Eskom distribution or transmission lines. The 132 kV line corridor is located 2.3 km south of the farmstead, i.e., not in significant proximity.

The owner has raised visual and noise concerns with regard to the band of turbines across the R318 from the property (nearest 1.7 km to farmstead) and the Alternative substation complex site near the entrance to the property and 600 m of the farmstead. The turbine issue could be resolved by setting back these turbines further from the R318 (distance unspecified). The preferred substation complex site is deemed acceptable, but the owner would prefer a greater setback from the southern boundary of 148/1 (currently proposed is 20 m) (van Eeden, pers. comm).

Matroosberg PNR and station

The Matroosberg PNR[26] is located to the west of the R318, across the road from Helpmekaar 148/9. The PNR also includes Ratelbosch 149/16. The decommissioned Matroosberg Station is located on Ratelbosch 149/2 within the estate. The station complex is located approximately 500 m to the west of the R318 and the Hugo site (Photograph 3.21). Access is directly off the R318. The station complex straddles the railway line and consists of around 20 buildings, including former staff houses. Ratelbosch 149/2 is enclosed by the Matroosberg PNR estate. The station complex is adjacent to the farmyard.

[26] Not reflected as a declared NPR on the DFF&E's Register of Protected Areas.

Photograph 3.21: Matroosberg Station, viewed from the R318.

Matroosberg station was decommissioned after the Hex River rail tunnel was opened a few decades ago. The buildings have been damaged by vandals and scavengers. The property has been leased to the owner of 148/RE since 1998, mainly to protect the buildings. Helpmekaar 148/RE is used for farming. The owner's son resides on the property. Three restored houses in the station complex are leased out as tourist accommodation (Karoohuises). Other facilities include a bar, a Lapa, restaurant, and a theatre. Matroosberg has served as the venue for arts events and festivals (e.g. Herfsprag festival). Matroosberg mainly caters to the Cape 'Karoo breakaway' market. The cottages are popular for longer stays (school holidays). The potential exists to lease more cottages out. Two shooting ranges are located on the property, one of which directly adjacent to the R318.

The immediate context is moderately disturbed. A small Eskom substation is located to the south-west of the built-up area. Two 66 kV lines traverse the entrance road. Rail cuttings are conspicuously visible along the entrance road. The R318 is clearly visible from the built-up area. The nearest turbines are proposed approximately 1.5km southeast of the Matroosberg station node. The key scenic viewshed is towards the Hex River range and Matroosberg peak to the west, i.e. away from the Hugo site. The approaches on the R318 and entrance road are however exposed to the site. The Matroosberg owner has raised concerns with regard to potential visual and noise impacts (and knock-on impacts on sense of place) associated with the band of turbines located immediately to the east of the R318 (the nearest is 600m from the road). The issue could be resolved by setting back these turbines further from the R318 (distance not defined) (du Preez, pers. comm).

3.7.4 Other proposed renewable energy facilities

The Hugo WEF site is not located within a renewable energy development zone (REDZ). The DFF&E's Renewable Energy Applications website[27] only indicates historic applications (effectively 4 projects) for solar PV REFs within a 30 km radius of the centre of the site (Figure 3.9). Historic applications for more substantial SEFs are located to the north-east of the site, namely for the Touwsrivier CPV (original site extent) and Montague Road PV SEFs, directly adjacent and near adjacent to the site, respectively.

[27] https://egis.environment.gov.za/renewable_energy

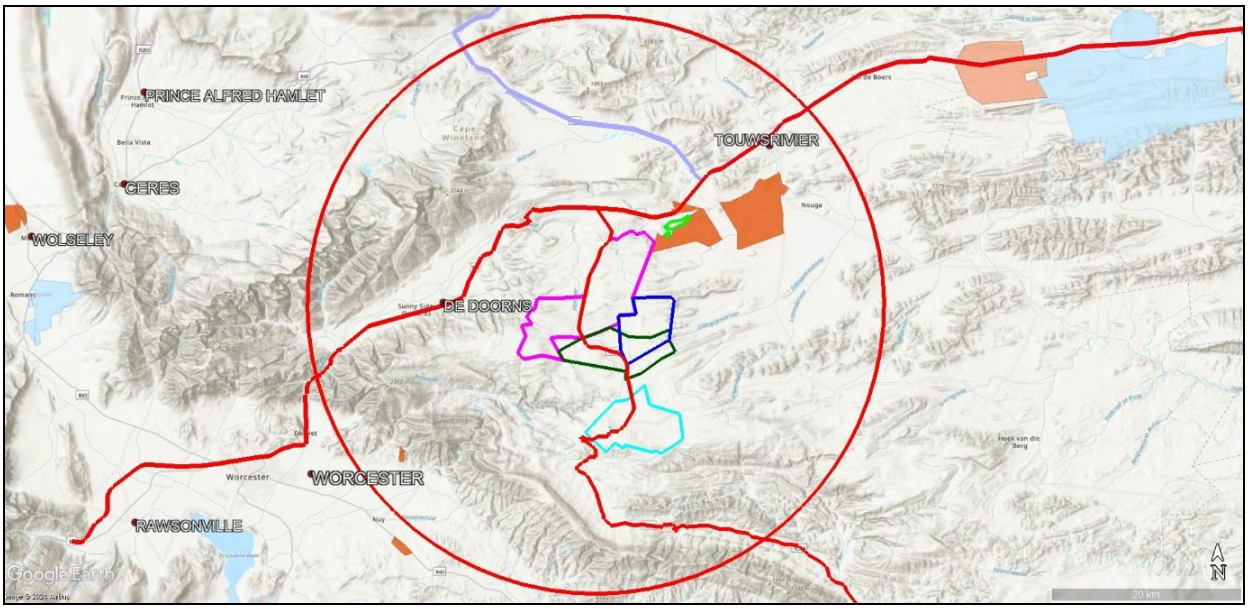


Figure 3.9: Hugo WEF site (pink outline) in relation to historic Solar PV applications (orange fill) and WEF applications (blue fill) within a 30 km radius of the centre of the Hugo site (red circle). Also indicated are the operational Touws River CPV SEF footprint (light green outlines), concurrently proposed Khoe WEF (light blue), and overlapping Mainstream Ezelsjacht WEF and Ezelsjacht PV (dark blue). Also indicated are key roads (red lines) and the Komsberg REDZ boundary (grey line).

The only operational REF within a 30 km range of the site is the Touws River CPV SEF located 1 km north-east of the site. The 36 MW facility became operational in 2014. Not yet reflected on the DFF&E's website, are concurrent applications for the Khoe WEF ~7 km to the south of the Hugo site, and for Mainstream's overlapping 110 MW Ezelsjacht PV SEF and 140 MW Ezelsjacht WEF adjacent to the south of the site. In total, 4 REFs, of which 3 WEFs, are currently proposed along the R318. The WEF proposals straddle the R318, and cover much of the stretch between the (old) railway line and Rooihoogte pass.

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an overview of key social issues identified that will be assessment during the Assessment Phase. The identification of key issues was based on:

- Review of project related information.
- Site visit and interviews with key stakeholders.
- Experience of the author with the area and local conditions.
- 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.

However, the Western Cape Provincial Spatial Development Framework (WCSDF) highlights the importance of the Province's landscape and scenic assets, noting that they underpin the tourism economy. The WCPSDF identifies the mountain ranges belonging to the Cape Fold Belt together with the coastline as the most significant in scenic terms and underpin the WCP's tourism economy and notes that several scenic landscapes of high significance are under threat, including landscapes under pressure for large scale infrastructural developments such as ***wind farms.*** The development of large scale wind farms in the area to the south of the N1 may therefore not be ideal, specifically given the scenic and environmental qualities of the area.

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 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.

4.3.1 Creation of local employment and business opportunities

The construction phase will extend over a period of approximately 18-24 months and create in the region of 200-250 employment opportunities that will benefit members from the local communities in the area, including De Doorns and Touws River. These opportunities will include opportunities for low, semi and highly workers. Most of the employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. 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. Based on information from similar projects the total wage bill 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.

The capital expenditure will be approximately R 8 billion (2024 Rand value) and will create opportunities for local businesses. However, given the technical nature of the development most benefits are likely to accrue to companies based in the Cape Metro. 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.

Two existing tourism operations in the broader study area, Matroosberg Karoohuisies and Karoo1 Village, have identified opportunities associated with the construction of WEFs in the study area (du Preez, Howard, pers. comm). Opportunities would also be available to Sandvlei and other accommodation providers in the broader study area.

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 (June 2020). The study found that to date, a total of 52 603 job years[28] have been created for South African citizens, of which 42 355 job years were in construction and 10 248 in operations. To date, 42 355 job years for SA citizens were achieved during construction, which is 26% above the planned 33 707 job years for active projects. These job years are expected to rise further since 23BW4 projects are still in or entering, 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

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

expectation for local community participation was 13 284 job years. To date 22 935 job years have been realised (i.e. 73% 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 53%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 43% and 49% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (84%) 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 (69%) and operations (80%) 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 49% and 68% 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 Enhancement	**With Enhancement**
Extent	Local – Regional (2)	Local – Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Highly probable (4)
Significance	Medium (30)	Medium (44)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement Measures: **Employment** • Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. • Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. • Before the construction phase commences the proponent should meet with representatives from the BWM to establish the existence of a skills database for the area. If such a database exists, it		

should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

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

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

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 manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

Workers are likely to be accommodated in nearby towns of Touws River and De Doorns. 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. However, as indicated above, the availability of suitably qualified workers in the area is likely to be limited. There is therefore likely to be a need to use construction workers from outside the area. Accommodating these workers in Touws River and De Doorns will pose a potential risk to the local community.

While the risks associated with construction workers at a community level are likely to be low with mitigation, 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	
Recommended enhancement measures: • The proponent, in consultation with the local municipality should investigate the option of establishing a Monitoring Committee (MC) to monitor and identify potential problems that may arise during the construction phase. • Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase. • The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report and resolve incidents. • Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. • The proponent 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 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 contactor to effectively manage and monitor the movement of construction workers on and off the site. • The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. • No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
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. However, given the location of the project and relatively short duration of the construction phase the potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. 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	

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

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent 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.
- 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.

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 famers, farm workers and visitors in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may 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. Based on feedback from interviews with local landowners, stock theft was not identified as a key concern. This is linked to relative isolation and low stock concentrations. Security cameras have also been fitted at various points along the R318 and monitored by a security company (Koo Karoo Farm Safety). However, the risk to stock will need to be considered. 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.

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

Recommended mitigation measures:

- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- The developer(s) and local farming community should co-ordinate (and if necessary, upgrade) security arrangements, such as establishment of security cameras at strategic locations.
- 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 MC (see above) that includes local farmers and develop a Code of Conduct for construction workers. The MC should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before construction activities commence.
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
- The Environmental Management Programme (EMPr) 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, except for security personnel, should be permitted to stay over-night on the site.

Residual impacts: No**,** provided losses are compensated.

Assessment of No-Go option

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

4.3.5 Nuisance impacts associated with construction related activities

The 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. In terms of potential traffic related impacts associated with the construction phase, the transport of wind turbine components has the potential to impact on the N1 and R318. All the properties in the Agterveld and Koo Valley are primarily accessed off the R318. There is no alternative road to Worcester, the nearest large town. Tourism operations along the Nougaspoort Road indicated that guests almost exclusively make use of the R318 to access

facilities in the area and not the Touwsrivier-Montagu gravel road. Key use periods are over weekends and public holidays. The R318 also serves as a key link to the N1 for fruit farming operations in the Koo to transport their produce to markets. The timing of the transport of turbine components will therefore need to be timed to avoid / reduce impacts on the N1 and R318.

The potential noise, dust and safety impacts associated with on-site construction activities will be localised 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.

Table 4.5: **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	
Recommended mitigation measures • Timing of transport of wind turbine components to the site along the N1 and R318 should be timed to avoid / reduce the impact on other road users. This includes avoiding weekends and holiday periods. • The movement of construction vehicles on the site should be confined to existing and 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. • Damage to the R318 and internal farm roads that is attributed to the WEF should be repaired before the commissioning of the WEF. • 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 the R318 and local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.		

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

4.3.6 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, private conservation areas, and farm infrastructure. The risk of grass fires was identified as a key risk during the dry, windy summer months (October-May).

Table 4.6: Assessment of impact of increased risk of grass fires

Nature: Potential loss of livestock, crops, houses, natural veld, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Recommended mitigation measures • The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. • Smoking on site should be confined to designated areas. • Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months. • Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. • Contractor should provide fire-fighting training to selected construction staff. • No construction staff, 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 should compensate farmers for 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.

4.3.7 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 crops and grazing. However, experience from other WEFs is that impact on farming operations can be effectively minimised and mitigated by careful planning in the final layout of the proposed WEF and associated components. Based on the findings of the SIA no layout issues were raised by the affected two landowners. Turbine footprints impact on veld used for limited grazing on 148/9. Footprints on the Hugo properties affect veld and abandoned dryland cropping areas. The proposed turbine layout therefore acceptable to both landowners. The substation complex sites are also acceptable to the relevant owners.

The impact on farmland associated with the construction phase can also 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. Recommended mitigation measures are outlined below. The timing / phasing on construction activities should where possible also be planned to avoid and or minimise disruption to farming operations. Affected landowners should be involved in planning of timing of construction activities.

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, batching plants, laydown areas, construction camp and the movement of heavy vehicles 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
Recommended mitigation measures • 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 WEF also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet most of its energy needs, and secondly, within the context of the success of the REIPPPP. However, it should be noted that these benefits are not site dependent and would also be associated with alternative sites.

Improved energy security
South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators[29].

Energy expert, Chris Yelland, has estimated the cost of Stage 1 load shedding resulting in 10 hours of blackouts per day for 20 days a month results in losses of R20 billion per month. Based on this Stage 2 load shedding costs the economy R40 billion per month and

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

Stage 3 is estimated to cost the South African economy R80 billion per month[30]. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period[31].

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 on

[30] The economic consequences of load shedding in South Africa and - Generator King (genking.co.za)

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

loss of resources?	ecosystems	climate change
Can impact be mitigated?	Yes	
Recommended mitigation measures • 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 and business opportunities

The proposed development will create~ 20 full-time employment opportunities during the operational phase. Based on similar projects the annual operating budget will be in the region of R 24 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	
Enhancement Measures: ***Employment*** • Where reasonable and practical, the proponent should implement a 'locals first' policy, especially for semi and low-skilled job categories. • Where feasible, training and skills development programmes for locals should be initiated as part 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 BWM with regards the establishment of a database of local		

companies, specifically BBBEE companies, which qualify as potential service providers for the operational phase. 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 operational phase.
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 be required to either purchase the land or enter into a rental agreement with the affected landowners for the use of the land for the establishment of the proposed WEF. Farming operations are impacted by droughts and market fluctuations. Any additional source of income therefore represents a benefit for the affected landowner(s). The additional income would assist to reduce the risks to their livelihoods posed by droughts and fluctuating market prices for outputs and farming inputs, such as fuel, feed etc. The additional income would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy.

Table 4.10: Assessment of benefits associated with income generated for the affected landowners

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	
Recommended enhancement measures 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 WEF can be used to support a number of social and economic initiatives in the area, including:

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

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

SED contributions do therefore create opportunities for local rural communities. However, SED contributions can also be mismanaged. This is an issue that will need to be addressed when managing SED investments.

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 Enhancement[32]**
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

[32] Enhancement assumes effective management of SED contributions.

Can impact be enhanced?	Yes
Recommended enhancement measures • The proponents should liaise with the BWM 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 WEF will impact on the areas existing rural sense of place. Based on the findings of the SIA and the Visual Impact Assessment (VIA) (MetroGIS, July 2024) there are several nature reserves and tourist facilities located in the area. The VIA notes that there are three formally protected areas within the study area, namely the Cape Floral Region Protected Area, Touw Local Nature Reserve and Drie Kuilen Private Nature Reserve. The Cape Floral Region is also a World Heritage Site as recognized by UNESCO. The Drie Kuilen PNR offers a variety of activities such as game drives, hikes and overnight accommodation. There are also several non-designated private natures reserves and guest farms located within the study area, namely Aquila Private Nature Reserve to the north, Middelberg guest farm, Leeuwenboschfontein guest farm, Porcupine Peak guest farm and Exemia Private Game Reserve can be found near the centre of the study area. All the reserves and farms offer tourist accommodation facilities and activities. The attraction of these areas is linked to the rural character of the area, including the views and vistas. The Hugo WEF is therefore located in an area that can be described a visually sensitive.

The findings of the VIA (MetroGIS, July 2024) are summarized below.

Potential visual impact on sensitive visual receptors (residents and visitors) located within a 5km radius of the wind turbine structures
The operation of the Hugo Wind Energy Facility is expected to have a **very high** visual impact on observers/visitors residing at homesteads and tourist accommodation facilities within a 5km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on sensitive visual receptors (observers travelling along roads) located within a 5km radius of the wind turbine structures
During the entire operational lifespan of the Hugo Wind Energy Facility, it is expected that daily commuters and possible tourists travelling along the various roads within 5km of the wind turbine structures may be negatively impacted upon by the visual exposure to the proposed infrastructure, however brief. It is assumed that the observers travelling along these roads will view the visual intrusion of the turbines in a negative light when compared with the rural and scenic quality of the surrounding landscape. The operation of the Hugo

Wind Energy Facility is expected to have a **high** visual impact on observers traveling along the roads within a 5km radius of the wind turbine structures. This includes observers travelling along the R318 and N1. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on sensitive visual receptors (residents of homesteads/ tourist accommodation) within a 5 – 10km radius of the proposed WEF

The Hugo Wind Energy Facility could have a **very high** visual impact on residents of (or visitors to) homesteads and tourist accommodation within a 5 - 10km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on sensitive visual receptors (observers travelling along roads) located within a 5-10 km radius of the wind turbine structures

The Hugo Wind Energy Facility could have a **high** visual impact on observers travelling along the R318 and N1 within a 5 - 10km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on formally protected areas within 5-10 km radius of the proposed wind turbines

The Hugo Wind Energy Facility could have a **very high** visual impact on visitors/ tourists to the Cape Floral Region, a formally protected area and World Heritage Site located within a 5 - 10km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on sensitive visual receptors (residents of and visitors to homesteads) within 10 – 20km radius of the proposed wind turbine structures

The Hugo Wind Energy Facility could have a **moderate** visual impact on residents of (or visitors to) homesteads/tourist accommodation within a 10 - 20km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on sensitive visual receptors (observers travelling along roads) located within a 10-20 km radius of the wind turbine structures

The Hugo Wind Energy Facility could have a **moderate** visual impact on observers travelling along roads within a 10 - 20km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Potential visual impact on formally protected areas and private nature reserves within 10-20 km from the proposed wind turbines

The Hugo Wind Energy Facility could have a **moderate** visual impact on visitors/ tourists to the Drie Kuilen Private Nature Reserve (formally protected area) and the Exemia PNR (non-designated), located within a 10 - 20km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Night light impacts
This anticipated lighting impact on residents of homesteads and visitors to tourist accommodation is likely to be of **very high** significance and may be mitigated to **high** especially within 0-5km and potentially up to 10km radius of the wind turbine structures. Similarly, lighting impacts on observers travelling along roads is anticipated to be of **high** significance which may be mitigated to **moderate**.

Ancillary infrastructure
On-site ancillary infrastructure associated with the WEF includes a 132kV substation and collector substation, Battery Energy Storage System (BESS), underground cabling between the wind turbines, internal access roads, gate house, Operation and Maintenance buildings. The anticipated visual impact resulting from this infrastructure is likely to be of **moderate** significance post mitigation. It should be noted that the preferred alternative for the substation would have a lower significance rating owing to the greater distance from the R318 and the closest homestead.

The potential impact on the sense of place of the region
The VIA notes that sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), play a significant role. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Based on the findings of the VIA the significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of **very high** significance. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Conclusion and recommendations
The VIA notes that a risk averse approach has been adopted in so far as to assume that the perception of most (if not all) of the sensitive visual receptors (bar the landowners of the properties earmarked for the development), would be predominantly negative towards the development of a WEF in the region. However, the VIA also notes that that what constitutes a visual impact is subjective and there are also likely to be supporters of renewable energy facilities, such as the proposed Hugo WEF. The VIA indicates that several objections to the proposed Hugo WEF were received by both the EAP and author of the author of the VIA. These concerns are largely associated with the potential visual impact of the proposed WEF on their places of residence, guest farms/reserves and the overall sense of place of the region.

In terms of overall findings, the VIA notes that the visual impact of the proposed Hugo WEF on the overall study area is likely to be **Very High to High**, especially within (but not restricted to) a 0 – 10km radius (and potentially up to a 20km radius) of the proposed facility. Tourists both travelling through the region and visiting tourist facilities, as well as residents of homesteads will likely experience visual impacts where the wind turbine structures are visible.

However, the VIA notes that despite the predominantly very high to high residual ratings and the likelihood that the proposed development will be met with concern and objections from some of the affected sensitive receptors and landowners in the region the visual impacts are not considered to be fatal flaws for a development of this nature. However, the VIA notes that the proposed Hugo WEF will only be supported from a visual perspective if

the recommendations contained in the report are implemented and the layout is adjusted. The layout adjustments are:

- Turbines labelled WTG 18, 19, 21, 23, 27 and 28 in the east be relocated outside of areas marked as mountains and tall hills (high sensitivity).
- Turbines labelled WTG 1, 2, 3, 9, 10, 11 and 12 in the west be reconsidered and located outside of areas marked as mountains and tall hills (high sensitivity).
- While no turbines are located within the stipulated 500 m buffer from the R318, it should be noted that the Breede Valley Local municipality and the Langeberg Spatial Development Framework considers the R318 to be a scenic route. Therefore, the implementation of a 1 km buffer along this route is considered to be preferrable by the visual specialist

Table 4.12: Visual impact and impact on sense of place (VIA, Logis 2024)

Nature of Impact: The potential impact on the sense of place of the region.		
	Without mitigation	**With Mitigation**
Extent	Long distance **(1)**	Long distance **(1)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very High **(10)**	Very High **(10)**
Receptor sensitivity	Very high **(10)**	Very high **(10)**
Landscape Character	High **(8)**	High **(8)**
Probability	Definite **(5)**	Definite **(5)**
Significance	Very High **(82)**	Very High **(82)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: ➢ Maintain the general appearance of the facility as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.		

Concerns regarding the visual impact of the Hugo WEF on the areas sense of place were also raised during interviews conducted as part of the SIA. A summary of the concerns raised by different landowners is provided below.

Based on the findings of the SIA the site properties associated with the Hugo WEF border onto 21 properties (excluding rail parcels). The properties are used for farming, conservation, and tourism purposes. Residential and tourist accommodation receptors are associated with 6 directly adjacent properties, namely Ratelbosch 149/1 (Ratelbosch farmyard and tourist accommodation), Ratelbosch 149/6 (Bloekom Huisie cottage), Ezelsjacht 171/RE (Zoutrivier yard, Ezelsjacht Guest Farm), Ezelsjacht 171/2 (Middelberg Guest Farm and Camp Site), Dennegeur 609 (Keurbos farmyard), Helpmekaar 148/1 (Uitsig

farmyard), Helpmekaar 148/RE (Helpmekaar farmyard, and Matroosberg Station node). In addition, several non-adjacent key tourism operations are located within 10km of the site.

Karoo1
The owner has indicated that the proposed development was unlikely to have a significant visual and sense of place on receptors on Karoo1.

Kamagu Safari Lodge
The Kamagu Safari Lodge is located along the N1 in the immediate vicinity of Touws River PV facility. The nearest turbines are proposed approximately 3.5 km south of the Lodge, and ~5.7 km south-west of the Kleinstraat farmyard. Visual impacts may therefore occur. However, both receptors are located in a moderately disturbed context (N1, railway lines, Touws River PV plant).

Ratelbosch Guest Farm
Ratelbosch Guest Farm is located on Ratelbosch 149/1 adjacent to the east of the site. The property is currently used for farming (livestock, irrigated fodder crops and vegetable seed), but the owner is in the process of reviving a guest accommodation facility (Ratelbosch cottage) and establishing a paying hunting destination. The nearest turbines are proposed 2.5 km from the facility, and 200 m from the property boundary. The owner has indicated that the proposed layout was likely to be acceptable (as receptors are screened), but this would need to be confirmed by the Visual and Noise studies. The proposed hunting activities would be set up to account for safety setbacks (i.e. restricting shooting to the west), and no impacts on the feasibility of the venture are anticipated (Bester, pers. comm).

Ezelsjacht Guest Farm
A section of the property is located adjacent to the south-east of the Hugo site. Two Mainstream renewable energy projects are currently proposed on the property, namely the 110 MW Ezelsjacht Solar PV on 149/6, and the 140 MW Ezelsjacht WEF on all four of the properties. The farmstead is located 3.2 km to the south of the nearest proposed Hugo turbine. A tourist accommodation cottage (Bloekom Huisie) is located 4 km to the north of the yard, approximately 650 m east of the proposed Mainstream PV development area, and approximately 3.1 km east of the nearest proposed Hugo turbine.

Middelberg Guest Farm
Middelberg Guest Farm is located adjacent to the south-east of the site. Die Koshuis, a facility with 40 bunk beds and other amenities, is located on the yard (171/2). A self-catering guest cottage (10 beds) is located ~110 m to the west of the farmstead (Photograph 3.20). A small camp site (6 stands) is located in the northernmost corner of the estate, near the Hugo site boundary. Key attractions are considered the 'working Karoo farm' setting, the natural veld, and the starry night skies. The key viewshed from the yard and cottage is to the south-east, i.e. away from the Hugo WEF site. The camping site is however exposed to the site. The nearest turbine is proposed 2.6 km north of the site. The owner raised concerns about potential visual and sense of place impacts on Middelberg, and specifically the camp site (Havinga, pers. comm).

Uitsig farm
Helpmekaar 148/1 is located across the R318 from the site (148/9). The farmstead is occupied over weekends and holidays by the owner and private guests. No tourism is currently associated with the property, but the owner contemplates the development of a camping site and mountain bike route. The owner has raised visual and noise concerns about the band of turbines across the R318 from the property (nearest 1.7 km to farmstead) and the alternative substation complex site near the entrance to the property

and 600 m of the farmstead. The preferred substation complex site is deemed acceptable, but the owner would prefer a greater setback from the southern boundary of 148/1 (currently proposed is 20 m) (van Eeden, pers. comm).

Matroosberg PNR and station

The Matroosberg PNR[33] is located to the west of the R318, across the road from Helpmekaar 148/9. The PNR also includes Ratelbosch 149/16. Three restored houses in the station complex are leased out as tourist accommodation (Karoohuises). The cottages are popular for longer stays (school holidays). The nearest turbines are proposed approximately 1.5km southeast of the Matroosberg station node. The key scenic viewshed is towards the Hex River range and Matroosberg peak to the west, i.e. away from the Hugo site. The approaches on the R318 and entrance road are however exposed to the site. The Matroosberg owner raised concerns about potential visual and noise impacts associated with the band of turbines located immediately to the east of the R318 (the nearest is 600m from the road). The issue could be resolved by setting back these turbines further from the R318 (distance not defined) (du Preez, pers. comm).

Based on the findings of the SIA, although visual impacts associated with the Hugo WEF were identified as a concern, they were not regarded as a fatal flaw. In addition, based on the comments from affected landowners, with mitigation (relocation of certain turbines), some of the concerns raised can be addressed.

As indicated above, that while the VIA assumes in its approach that most observers would be predominantly negative towards the development of a WEF in the region, based on the findings of this and other SIAs for wind farms, this not necessarily always the case. While some landowners and travellers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective. The table below assess the significance for stakeholders who do view the visual impact of wind turbines in a negative light. The table also reflects the position of some of the affected landowners who were interviewed during the SIA.

Table 4.13: Assessment of potential visual impact based on comments from local landowners

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 (3)	Local (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate-High (6-8)	Moderate-High (6-8)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium-High (52-60)	Medium-High (52-60)
Status	Negative	Negative
Reversibility	Yes, WEF components and other infrastructure can be removed.	
Irreplaceable loss of	No	

[33] Not reflected as a declared NPR on the DFF&E's Register of Protected Areas.

resources?		
Can impact be mitigated?	Yes	
Mitigation • The recommendations contained in the VIA should also be implemented. • Install radar activated civil aviation light system.		
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

A literature review was undertaken as part of the SIA. It should be noted that the review does not constitute a property evaluation study and merely seeks to comment on the potential impact of wind farms on property values based on the findings of studies undertaken overseas. The assessment rating is based on the findings of the review. In total five articles were identified and reviewed namely:

- Stephen Gibbons (April 2014): Gone with the wind: Valuing the Visual Impacts of Wind turbines through house prices. London School of Economics and Political Sciences & Spatial Economics Research Centre, SERC Discussion Paper 159.
- Review of the Impact of Wind Farms on Property Values, Urbis Pty Ltd (2016): Commissioned by the Office of Environment and Heritage, NSW, Australia.
- Yasin Sunak and Reinhard Madlener (May 2012): The Impact of Wind Farms on Property Values: A Geographically Weighted Hedonic Pricing. School of Business and Economics / E.ON Energy Research Center, RWTH Aachen University. Model Working Paper No. 3/2012.
- Martin D. Heintzelman and Carrie M. Tuttle (March 3, 2011): Values in the Wind: A Hedonic Analysis of Wind Power Facilities. Economics and Financial Studies School of Business, Clarkson University.
- Ben Hoen, Jason P. Brown, Thomas Jackson, Ryan Wiser, Mark Thayer and Peter Cappers (August 2013): A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Ernest Orlando Lawrence Berkeley National Laboratory.

Based on the findings of the literature review the potential impact of WEFs on rural property values is likely to be low, specifically for farms that are farmed as productive farms. However, there are several nature reserves and tourist facilities in the area. The attraction of these areas is linked to the rural character of the area, including the views and vistas. The potential for the proposed WEF to visually impact on a number of these facilities and their associated property values therefore exists. As indicated above, the findings of the VIA (Logis, May 2024) indicate that the visual impact of the Hugo WEF on the areas sense of place will be **Very High** to **High**.

A Tourism Impact Assessment was undertaken by Urban Econ as part of the EIA (Urban Econ, 2024). The study also assessed the potential impact on property and land values in the affected area, including the impact on game farming operations. A detailed literature (international and local) was undertaken as part of the study. The study notes that the review of international literature corroborates the absence of direct linkages between wind farm developments and property prices with various studies confirming that there is no

long-term impact of wind farms on property values. Based on the local review, the Urban Econ study notes that in summary, the introduction of wind farm developments did not negatively impact property sales in the specified areas. While farm sales remained stable, there was a noticeable increase in the average sale price. The presence of wind farms did not deter buyers, instead, it may have motivated them, as evidenced by the upward trend in both sales and prices. Overall, there is no clear indication of a negative correlation between wind farm development timing and property sales in this section. Based on the findings of the study the impact of wind farms on local property values during the operational phase was rated as **Low Positive** (with and without enhancement). Property agents interviewed as part of the study noted that there was an increase in the price of agricultural property linked to the potential to rent out portions to the IPP companies. The same trends continued where wind farms are installed.

However, given the location of the proposed Hugo WEF and proximity of established nature-based tourism activities, the potential impact on property values of the directly affected properties is likely to be **Medium Negative**. This represents a negative externality for which the owners of these facilities may potentially suffer a financial loss. Effective mitigation would require the developer to compensate the affected landowners for the impact. In the event the Hugo WEF is approved, the developer should liaise with the owners of the directly affected facilities to assess the potential impact of the Hugo WEF on property values and considered the option of compensation. Based on the findings of the SIA these include Middelberg Guest Farm, Uitsig Farm and Matroosberg PNR and Station (see above).

Table 4.14: Assessment of potential impact on value of visually affected properties

Nature: Potential impact of the WEF on property values		
	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)[34]
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Mitigation • The recommendations contained in the VIA should also be implemented. • The developer of the Hugo WEF should liaise with the owners of the affected operations to assess the potential impact of the WEF on property values and the option of compensation. An independent property valuator should be appointed at the cost of the developer to undertake the assessment. • Install radar activated civil aviation light system.		
Residual impacts: Linked to visual impact on sense of place.		

[34] Assumes affected property owners are fully compensated to their satisfaction for impact on property values.

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

4.4.7 Potential impact on tourism

A review of international literature in the impact of wind farms was undertaken as part of the SIA. Three articles were reviewed, namely:

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

Based on the findings of the literature review the potential impact of WEFs on rural property values is likely to be low, specifically for farms that are farmed as productive farms. However, there are several nature reserves and tourist facilities in the area. The attraction of these areas is linked to the rural character of the area, including the views and vistas. The findings of an international literature review undertaken by Urban Econ (2024) found that there is a difference between public attitude towards clean energy in general, and opposition for development of wind energy facilities in localities that are endowed with scenic landscapes used to attract visitors to the area. The potential for the proposed Hugo WEF to visually impact on tourism related activities in the study area therefore exists. The attraction of these areas is likely to be linked to the rural character of the area, including the views and vistas. As indicated above, the findings of the VIA (Logis, May 2024) indicate that the visual impact of the Hugo WEF on the areas sense of place will be **Very High** to **High**.

A Tourism Impact Assessment was undertaken by Urban Econ as part of an EIA for the Angora WEF located to the southwest of Richmond in the Northern Cape. Based on the findings of the study the impact on a tourism facility that was visually exposed to the Angora WEF was rated as **Medium Negative** with and without mitigation. Based on the findings of the SIA it is reasonable to assume that this rating would also apply to the properties affected by the Hugo WEF. The Hugo WEF therefore has the potential to impact negatively on existing tourism operations in the study area that are visually exposed to the wind turbines. This represents a negative externality for which the owners of these facilities may potentially suffer a financial loss.

In the event the Hugo WEF is approved, the developer should liaise with the owners of the affected facilities to assess the potential impact of the Hugo WEF on future tourism operations and considered the option of compensation if a direct impact can be established. This would include monitoring occupancy levels pre and post the establishment of the Hugo WEF to assess if there are any marked changes that could be attributed to the establishment of the Hugo WEF and associated visual impacts. The impact on tourism should also assess the impact on proposed tourism developments that would be impacted by the proposed WEF. Based on the findings of the SIA these include Middelberg Guest Farm, Uitsig Farm and Matroosberg PNR and Station (see above).

Two assessment ratings have been prepared, namely one for the potential impact of the WEF on local tourism operations that are visually impacted by the Hugo WEF and one for the impact of the WEF on general tourism in the study area.

Table 4.15: Impact on local tourism operations visually impacted by WEF

Nature: Potential impact of the WEF on tourism operations that are visually impacted		
	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)[35]
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: • The recommendations contained in the VIA should be implemented. • The developer of the Hugo WEF should liaise with the owners of the affected operations to assess the potential impact of the Hugo WEF on future tourism operations and the option of some form of compensation if a direct impact can be established.		
Residual impacts: Linked to visual impact on sense of place.		

Table 4.16: Impact on tourism in the region

Nature: Potential impact of the WEF on local tourism in the area		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	Low (16)	Low (16)
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: • The recommendations contained in the VIA should be implemented.		
Residual impacts: Linked to visual impact on sense of place.		

[35] Assumes affected property owners are fully compensated to their satisfaction for impact on tourism operations (current and proposed).

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

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the area's 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. The relevant issues identified by Scottish Natural Heritage study include:

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

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

The establishment of the WEF and other WEFs in the area will create the potential for combined and sequential visibility impacts. The findings of the VIA (Logis, 2024) note that the study area is not located within a REDZ, and as such very limited renewable energy facilities can be found within a 35 km radius. No other wind energy facilities have been authorized within a 35 km radius; however, three (3) solar PV energy facilities have been approved, namely Sanral PV SEF to the northwest and Touwsrivier and Montague Road Solar PV SEFs to the northeast.

The proposed Hugo WEF is also one half of a larger wind energy cluster consisting of another proposed WEF to the south, namely the Khoe WEF. The cumulative visual impact of the proposed Hugo WEF, together with the proposed Khoe WEF is expected to be **Very High**, depending on the observer's sensitivity to wind turbine structures. The VIA notes that owing to the sensitivity of the landscape, the high visual quality and the potential visual impacts on sensitive visual receptors, the cumulative visual impact is not considered to be within acceptable limits.

Table 4.17 reflects the findings of the VIA (Logis, 2024). These findings are supported by the SIA. In this regard the authorities will need to consider the overall suitability of establishing large wind farms to the south of the N1 in an area that is visually sensitive and has a number of established nature reserves and associated eco-tourism facilities. The location and operation of these facilities are linked to the areas largely undisturbed scenic landscape and views. The development of renewable energy facilities in the area to the south of the N1 also represents and spill over from the Komsberg REDZ which is located to the north of the N1. From a long-term planning perspective this may not be ideal, specifically given the environmental qualities of the area to the south of the N1. In this

regard the Western Cape Provincial Spatial Development Framework (WCSDF) highlights the importance of the provinces landscape and scenic assets, noting that they underpin the tourism economy. The WCPSDF identifies the mountain ranges belonging to the Cape Fold Belt together with the coastline as the most significant in scenic terms and underpin the WCP's tourism economy and notes that several scenic landscapes of high significance are under threat, including landscapes under pressure for large scale infrastructural developments such as ***wind farms.***

Table 4.17: Cumulative impacts on sense of place and the landscape (VIA, Logis 2024)

Nature of Impact: The potential cumulative visual impact of wind farms on the visual quality of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the Hugo and Khoe WEFs**
Extent	Medium distance (2)	Medium distance (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Very high (10)
Receptor sensitivity	Very high (10)	Very high (10)
Landscape Character	High (8)	High (8)
Probability	Highly probable (4)	Definite (5)
Significance	High (64)	Very High (85)
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation measures: N.A.		
Residual impacts: The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed, and the area rehabilitated. Failing this, the visual impact will remain.		

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

4.6 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The objective will be to source as many low and semi-skilled workers for the construction phase from the BVM and LM. This will reduce the pressure on local services and accommodation in the area. For a single WEF project ~ 200-250 workers may require accommodation. In the event of the construction phase for 2 projects overlapping, the total number of workers requiring accommodation would be between 400 and 500. The potential pressure on local services will depend on the number of locally based contractors and workers that are employed during the construction phase.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the area. These benefits will create opportunities for investment in the area, including the opportunity to up-grade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local

communities to benefit directly from the investments attracted into the area. The proposed WEF is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED. This will provide revenue that can be used by the BVM to invest in up-grading local services where required. In should also be noted that it is the function of national, provincial, and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the BVM.

Table 4.18: Cumulative impacts on local services

Nature: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF, in the BVM and LM 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)[36]
Status (positive/negative)	Negative	Negative
Reversibility	Yes. WEF 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 BWM to address potential impacts on accommodation and local services.		

Assessment on No-Go option

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

4.7 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the BVM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities. The potential cumulative benefits are associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. Steps must however be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

[36] With effective mitigation and planning, the significance will be Low Negative.

However, as indicated above, the authorities will need to consider the overall suitability of establishing large wind to the south of the N1 in an area that is visually sensitive and has several established nature reserves and associated eco-tourism facilities.

Table 4.19: Cumulative impacts on local economy

Nature: The establishment of renewable energy facilities and associated projects, such as the WEF, in the BWM 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. WEF 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 WEF, within the BWM should be supported.		

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

4.8 ASSESSMENT OF DECOMMISSIONING PHASE

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of 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[37]. The decommissioning phase is therefore likely to create additional construction type jobs, as opposed to the jobs losses typically associated with decommissioning. The number of people employed during the operational phase will be in the region of 20. Given the low number of people employed during the operational phase the decommissioning of the facility will not have a significant negative social impact on the local community. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme.

[37] There is also a possibility that the existing wind turbines may be replaced with new, more efficient turbines at the end of the first 20-year contract period. This would create additional employment opportunities and ensure that the existing operational phase jobs are maintained.

The decommissioning phase will also create employment opportunities. This will represent a positive impact. These jobs will, however, be temporary.

Table 4.20: 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.

4.9 ASSESSMENT OF NO-DEVELOPMENT OPTION

The primary goal of the project is to generate additional energy and improve energy security. 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 is 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. However, the benefits associated with the proposed development are not site dependent.

Table 4.21: 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 Mitigation [38]	**With Mitigation[39]**
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 WEF should be developed, and the 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.		

[38] Assumes project is not developed.
[39] Assumes project is developed.

SECTION 5: KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

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

- A review of key planning and policy documents pertaining to the area.
- A review of social and economic issues associated with similar developments.
- Site visit and interviews with key stakeholders
- A review of relevant literature on social and economic impacts.
- The experience of the authors with other renewable energy projects.

5.2 SUMMARY OF KEY FINDINGS

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

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

5.2.1 Policy and planning issues

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.

However, the Western Cape Provincial Spatial Development Framework (WCSDF) highlights the importance of the Province's landscape and scenic assets, noting that they underpin the tourism economy. The WCPSDF identifies the mountain ranges belonging to the Cape Fold Belt together with the coastline as the most significant in scenic terms and underpin the WCP's tourism economy and notes that several scenic landscapes of high significance are under threat, including landscapes under pressure for large scale infrastructural developments such as ***wind farms.*** The development of large-scale wind farms in the area to the south of the N1 may therefore not be ideal, specifically given the scenic and environmental qualities of the area.

5.2.2 Construction phase impacts

The key social issues associated with the construction phase include:

Potential positive impacts

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

The construction phase will extend over a period of approximately 18-24 months and create in the region of 200-250 employment opportunities. Members from the local communities in Ermelo and the LM would qualify for some of the low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a social benefit. The total wage bill will be in the region of R 25 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 BVM. The capital expenditure associated with the construction phase will be approximately R 8 billion (2024 Rand value). However, given the technical nature of the project most benefits will accrue to companies based in the Cape Metro. 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.

Potential negative impacts

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

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

Table 5.1: Summary of social impacts during construction phase

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

5.2.3 Operational phase impacts

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

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

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit. However, it should be noted that the benefits are not site dependent.

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

Concerns relating the potential visual impact of the proposed Hugo WEF on local properties and tourist related activities were raised by several property owners. The overall finding of the VIA (Logis July 2024) is that the proposed Hugo WEF will have a **High** to **Very High** visual impact on areas sense of place. However, despite the high visual impact VIA notes that the visual impacts are not considered to be fatal flaws for a development of this nature. The VIA therefore notes that the proposed Hugo WEF be supported from a visual perspective. The support is however subject to several wind turbines being relocated.

Based on the findings of the SIA the significance of the visual impact associated with the Hugo WEF on property values and tourism operations of visually impacted properties was rated as **Medium Negative** with and without mitigation. This implies that effective mitigation of the visual impacts will not be possible. This represents a negative externality for which the affected owners may potentially suffer a financial loss. In the even the Hugo WEF is approved, the developer of the WEF should liaise with the affected owners to assess the potential impact of the Hugo WEF on property values and future tourism operations and the option of some form of compensation if a direct impact can be established.

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

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to improve energy security and support renewable sector	Medium (Positive)	High (Positive)
Creation of employment and business opportunities	Low (Positive)	Medium (Positive)
Generate income for local landowners	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	High (Positive)
Visual impact on sense of place (VIA)	Very High-High (Negative)	Very High-High (Negative)
Visual impact and impact on sense of place (SIA)	Medium-High (Negative)	Medium-High (Negative)
Impact on property values of visually affected properties	Medium (Negative)	Low (Negative) [40]
Impact on tourism (affected properties)	Medium (Negative)	Low (Negative) [41]
Impact on tourism: Region	Low (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place
The potential visual impact of the proposed WEF and associated infrastructure on the areas sense of place is likely to **Very High Negative**.

Cumulative impact on local services and accommodation
The significance of this impact with mitigation was rated as **Low Negative**.

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

5.2.5 Decommissioning phase

Given the relatively small number of people employed during the operational phase (~ 20), 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.

[40] Assumes affected property owners are fully compensated to their satisfaction for impact on property values.
[41] Assumes affected property owners are fully compensated to their satisfaction for impact on tourism operations.

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. However, the benefits associated with the WEF are not site dependent and would also be associated with an alternative site.

5.3 CONCLUSION

The findings of the SIA indicate that the proposed Hugo WEF project will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy that will improve energy security in South Africa and contribute towards reducing the countries carbon footprint.

However, the Hugo WEF will have a negative visual impact on the areas sense of place. Based on the findings of the VIA (MetroGIS) the impact on sense of place is rated as **High Negative**. Effective mitigation is not possible. Concerns relating the potential visual impact of the proposed Hugo WEF on the areas sense of place and tourist related activities were raised by several landowners. The impact of the Hugo WEF on tourism activities was rated as Medium Negative with and without mitigation. This implies that effective mitigation will not be possible. This represents a negative externality for which the affected owners may potentially suffer a financial loss. While this loss may be offset by some form of compensation, given the areas visual sensitivity and number of established nature reserves and associated eco-tourism facilities the overall suitability of the area for the development of large-scale wind energy facilities, such as the proposed Hugo WEF, is a concern. The cumulative impacts are rated as **Very High Negative** which heightens the concern.

Statement and reasoned opinion
Based on the findings of the SIA the suitability of establishing large WEFs, including the proposed Hugo WEF, in the area to the south of the N1 is questioned. The development of renewable energy facilities in the area to the south of the N1 represents a spillover from the Komsberg REDZ located to the north of the N1. From a long-term planning perspective this may not be ideal, specifically given the environmental and scenic qualities of the area. In this regard the Western Cape Provincial Spatial Development Framework highlights the importance to the Province's landscape and scenic assets and threat posed by large scale infrastructural developments such as wind farms.

It is also important to note that the benefits associated with the Hugo WEF are not site dependent and would also be associated with an alternative site. This point is relevant given the environmental and social sensitivity of the study area.

Recommendations

Should the proposed Hugo WEF be approved, the following recommendations should be implemented:

- The recommendations of the VIA should be implemented, including the relocation of identified wind turbines and installation of radar activated civil aviation lights.
- The developer of the Hugo WEF should liaise with the owners of visually impacted properties to assess the potential impact of the Hugo WEF on property values and future tourism operations and the option of some form of compensation if a direct impact can be established.

ANNEXURE A

INTERVIEWS

- Bester, Mr Reon (telephonic 2024-04-16). Ratelbosch 149/1.
- De Kock, Mr Hennie (2024-03-28). Kalkoenvlakte 6, Eendragt 38/1, Eendragt 38/2, Eendragt 38/11.
- Deale, Mr Jonathan (telephonic 2024-04-10). Gecko Rock Private Nature Reserve.
- Du Plessis, Mr Christiaan (2024-03-28). Touwsrivier Heritage Conservation Society.
- Du Preez, Mr Dawie (telephonic 2024-04-17). Helpmekaar 148/RE; Matroosberg siding.
- Esterhuyse, Ms. Melanie (telephonic 2024-04-16). Hex River Valley Tourism.
- Falck, Mr Graeme (e-mail 2024-04-11). Ratelbosch 149/6, Zout Rivier 170, Ezelsjacht 171/2.
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- Kritzinger, Mr Johan and Ms Karen (2024-03-27; e-mail 2024-04-03). Krakadouw 56/2, Farm 34, Loopende Rivier 33/RE, Loopende Rivier 33/2(Eximia Private Game Reserve).
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- Van der Westhuizen, Ms Christelle (2024-03-28). Touwsrivier Tourism.
- Van Eeden, Mr Andre (telephonic 2024-04-16; 2024-04-17). Helpmekaar 148/1.
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ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Direct, indirect and cumulative impacts associated with the projects must 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**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein 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 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 of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 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 and can be assessed as low, medium or high; and
- 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 calculated by combining the criteria in the following formula:

S=(E+D+M)P

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 acceptability of the development footprint, or the decision process to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the acceptability of the development footprint, or the decision process to develop in the area unless it is effectively mitigated),
- 60-90 points: High (i.e. where the impact must have an influence on the acceptability of the development footprint, or the decision process to develop in the area).
- 90 points: Very High (i.e. where the impact must have an influence on the acceptability of the development footprint, or the decision process to develop in the area, and may constitute a fatal flaw where motivated by a specialist consultant)

ANNEXURE C

Tony Barbour
ENVIRONMENTAL CONSULTING

10 Firs Avenue, Claremont, 7708, South Africa
(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 and Armenia.

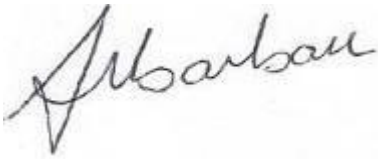
ANNEXURE D

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour, declare that -- General

declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

18 July 2024

Date: